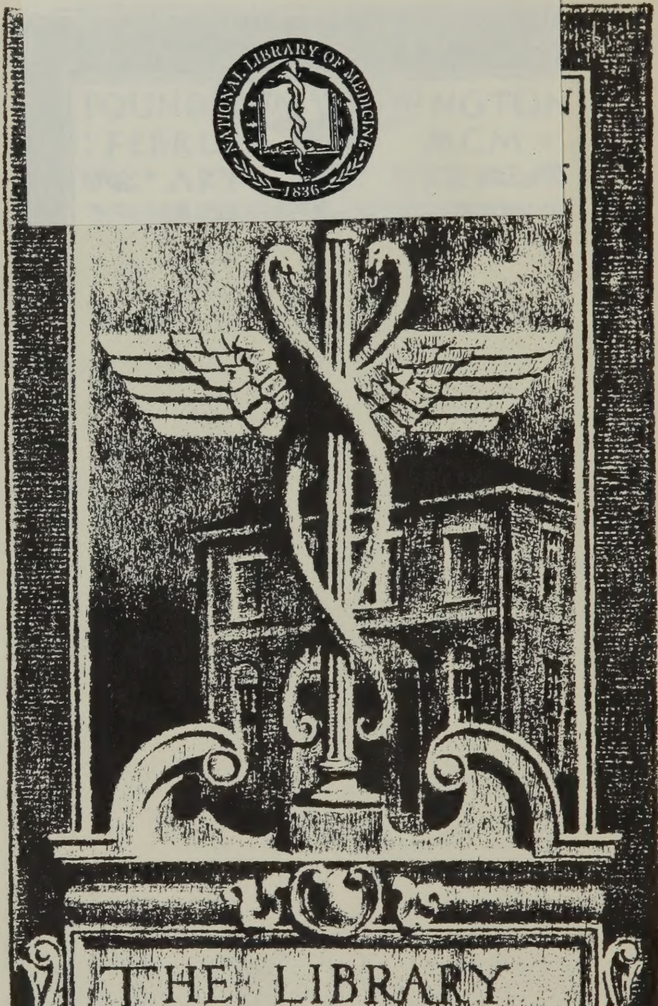
TEXT-BOOK

OF

NURSING

BY

CLARA S. WEEKS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A

TEXT-BOOK OF NURSING

FOR THE USE OF TRAINING SCHOOLS, FAMILIES, AND PRIVATE STUDENTS

COMPILED BY

CLARA S. WEEKS-SHAW

SECOND EDITION, REVISED AND ENLARGED
WITH ILLUSTRATIONS

NEW YORK
D. APPLETON AND COMPANY
1897

DEDICATED TO

ZILPHA E. WHITAKER,

IN MEMORY OF MUTUAL EFFORTS.

PREFACE TO THE REVISED EDITION.

THE great advances in medical science, and more particularly in the practice of surgery, during the half-dozen years since this book was first offered for the use of nurses, have rendered necessary a thorough revision, many things in the old edition being now entirely out of date, while other methods of treatment have come into vogue with which every nurse needs to be acquainted.

In preparing this revision I have been much indebted to the assistance and criticisms of Dr. H. C. Coe, and to Dr. G. W. Jarman, who has furnished the greater part of the material for the added chapter on Gynæcology.

Where this is used as a school text-book, it needs to be preceded by, or associated with, an elementary course in anatomy and physiology, for I have found it impossible, without increasing too much the size of the volume, to incorporate in it enough of these subjects to be of any real use, and have been obliged to assume some knowledge of them on the part of my readers.

C. W. S.

October, 1891.

PREFACE TO THE FIRST EDITION.

THE need of a more comprehensive Text-book than has yet been published seems to be generally felt in our Nursing Schools. The one now offered, with the exception of a few practical points, the result of personal observation, makes no claim to be regarded as anything more than a compilation, all authorities bearing upon the subject having been freely used. It is by no means intended to serve as a medical compendium, but it is hoped that it will save others the necessity, which has been so frequent in my own experience, of going through a mass of extraneous and over-technical matter in search of the little things which they need to know.

I desire to express my grateful acknowledgments to Prof. E. L. Youmans, for his kind encouragement and assistance, and to Dr. J. S. Hawley, to whose valuable criticisms and careful revision of the manuscript the book will largely owe any value that it may possess.

C. S. W.

NEW YORK, *June*, *1885*.

INTRODUCTORY.

THE recent efforts to improve and elevate the art of nursing, as shown by the multiplication of training-schools for its study and practice, are recognized by all as constituting one of the most truly beneficent movements of the age. In alliance with medical institutions, and supervised by the medical faculty to the end of the highest efficiency, these schools raise a vocation formerly regarded as vulgar, because followed by the ignorant, to the rank of a profession, thus opening a new field of activity to women, alike congenial, honorable, and remunerative. And, while the circumstances of a large number of women are thus essentially improved, the community reaps the priceless benefits of better care and mitigated suffering in sickness, more effectiveness in medical ministration, and the prolonging of human life. The immediate and positive good thus attained by the training-schools for nursing must lead to their extension in the future, and should commend them to the favor of all who can in any way aid in the promotion of their salutary objects.

I have sometimes thought that indirect benefits, also of much importance, are to be expected from this movement beyond its strictly technical objects. It gives to young women an education which, whether they follow the profession or not, will be of great and permanent value to them in the common experiences of domestic life. No possible social changes in the future can relieve woman of those cares and responsibilities which

spring from the maternal function and involve the welfare of the family; and it is too late to maintain that knowledge and training are not indispensable to the best performance of feminine home duties. But neither in the Ladies' Seminary, the High School, nor the Female College, is this invaluable education to be had. The training-schools for nurses give the best preparation of woman now available for her especial work and rule in the home sphere. By combining theory with practice, by uniting the cultivation of the head and the hand, the intellect, the feelings, and the active powers in a common discipline, they conform to the most advanced requirements of education. There are strong reasons, therefore, why young women of ability should in the future more and more avail themselves of the advantages of these schools.

The efficiency of schools is always much dependent upon the adaptation of text-books to the method of study adopted. The literature of the subject of nursing is, in many respects, excellent, but its comparative newness has left much to be desired in the way of improvement of the manuals of study. The text-book now offered has been prepared not merely to give information and lay down rules, but to guide systematic training on a practical subject, and to facilitate thoroughness of school-work. The volume has grown out of a familiar consciousness of the needs and difficulties of nursing, together with the experience of the working teacher, and the practical character it has thus acquired, its excellent method, and the clearness and directness of its style, show that in preparing it the author has done an admirable service to her profession.

E. L. YOUMANS.

June, 1885.

CONTENTS.

TEXT-BOOK OF NURSING.

CHAPTER I.

Necessity for the instruction of nurses—The nurse's work—Qualifications of a nurse—The duties of a nurse—to herself—to the doctor—to the patient—Hospital and private nursing.

THERE are few, especially among women, who will not at some time in their lives be called upon to officiate in the capacity of nurses; fewer still who will not at some time have occasion to be grateful for the ministrations of a skillful and efficient nurse, or annoyed by the blunders of an awkward and incompetent one; and yet it is only within a comparatively short time that the importance of special and thorough training for such work has become generally appreciated. There has been no opportunity for the acquirement of such education, however much individuals may have desired and felt the need of it.

Until within a few years, the nursing in our hospitals was committed to the hands of women of the lowest, often of the criminal, classes, chosen without regard to character or capacity. It was held a degrading occupation, which no self-respecting person would voluntarily adopt; and "Sairy Gamp" was recognized, not as the amusing creation of a novelist, but as the common type and representative of the nursing class.

It seems strange that this state of affairs should have so long been allowed to exist, for such coadjutors must have effected quite as much hindrance as help, and what useful purpose they could have served in hospitals, except as scrub-women, is incomprehensible to the trained nurse of to-day, who realizes the responsibility which her position involves, and the daily exercise of gentleness, firmness, and, above all, tact, which the successful management of a single ward necessitates. But a prejudice against the instruction of nurses was entertained at the outset by some of the medical profession, who feared that educated nurses would trench upon their own province, and, if they were taught to know one drug from another, would immediately proceed to the practice of therapeutics on their own account.

This feeling is fast dying out, as they come to see that in just this particular is the essential point of difference between the trained and the untrained nurse. It is only those who have had no formal instruction as to their duty, its extent and its limits, who are guilty of thus overstepping the bounds of propriety; not those who are taught, but those who are untaught, and who have picked up, in a hap-hazard way, certain isolated facts regarding medical treatment, which they generalize and act upon. The trouble with such nurses is not that they know too much, but that they know too little. It is impossible that, with sickness and its treatment always under their eyes, they should not assimilate some information; the only question is whether they shall be taught it systematically, and in its proper relations, or whether they shall be left to appropriate and use it empirically. The question has been sufficiently answered by the success of the training-schools, and the ever-increasing demand for nurses trained to a knowledge be-

fitting their position. The existence of the schools has been amply justified; it remains for each individual nurse to prove the thoroughness of her training, by showing how completely and exclusively she can mind her own business.

Says the great English physiologist: "If knowledge is real and genuine, I do not believe it is other than a very valuable possession, however infinitesimal its quantity be. Indeed, if a little knowledge be dangerous, where is the man who has enough to be out of danger!" Learn, then, all that you can—only take care that your knowledge is *real* and *genuine*, and not a mere smattering of technical terms—and you may be assured that the more you know, and the more thoroughly you know it, the more will you realize the depth of your own ignorance, and the less will you dare to make any other than the legitimate use of your knowledge.

Health has been comprehensively defined as the "perfect circulation of pure blood in a sound organism." Any departure from either of these three conditions constitutes disease. There is recognized in nature a certain tendency to reparation, a predisposition to return to the conditions of health, whenever there has been any deviation from them. To assist this is the object of treatment. To keep the patient in the state most favorable for the action of this reparative tendency, is especially the vocation of the nurse, and it is beyond a doubt that those who best understand this, and have the fullest acquaintance with Nature's processes, will be the most successful nurses.

The importance of the art of nursing can scarcely be overestimated; in many cases the recovery of the patient will depend more upon the care he receives than

upon medical skill. Nursing properly includes, as well as the execution of the physician's orders, the administration of food and medicine, and the more personal care of the patient, attention to the condition of the sick-room, its warmth, cleanliness, and ventilation, the careful observation and reporting of symptoms, and the prevention of contagion. It is a work which falls largely, though not exclusively, to the share of women, and it has sometimes been claimed that all women make good nurses simply by virtue of their womanhood. But this is far from true. To fitly fill such a position requires certain physical and mental attributes, which all women —even all good women—do not possess, as well as some special training. A natural aptitude for nursing is a valuable basis for instruction, but will not take the place of it, nor will good intentions ever compensate for a lack of executive ability.

Unimpaired health and power of endurance, intelligence and common sense, are primary essentials for a nurse. She should be a person of even, cheerful temperament, not easily irritated or confused—for to lose temper or presence of mind in the sick-room is fatal to usefulness. She must have acute perceptions, habits of correct observation and accurate statement, and some manual dexterity She needs to be quiet, neat and systematic, and capable of eternal vigilance.

There is still too prevalent the impression that it is a waste of ability for an educated woman to become a nurse; that it is a fit resource rather for those worn out, discouraged, or incapable of anything else. Those who have tried it know that, on the contrary, there is in this work room for the exercise of talents of the highest and virtues of the rarest order; and surely in this day, when there are so many women in need of occupation—

women of some degree of culture and refinement, who look in vain for some suitable outlet for their energies—it ought not to be true, as it is, that the majority of the applications for admission into our training-schools are from those utterly unfit for the work; either surviving relics of the by-gone times when a nurse ranked on or below the par of house-maid, or sentimentalists with their heads full of romantic visions of themselves flitting about like angels of mercy, bathing the brows of suffering heroes, and distributing among them flowers and smiles. The latter class are sure to be disappointed, generally disgusted, for they find the reality practical, prosaic, and often even revolting. But it is a field of usefulness such as is nowhere else afforded, and a woman with the requisite qualifications, who desires to be really of service to her fellow-creatures, and to adopt an employment of absorbing interest, at once honorable and remunerative, can not do better than to train herself for a nurse. It is to such as have entered upon this course with an earnest aim to well qualify themselves, and to elevate the professional standard, that the following instructions are addressed.

When you have once undertaken the care of a sick person, his welfare is of course understood to become your first consideration. With this object always in view, your duties may be classified as threefold: those which you owe to yourself, those due to the physician under whose direction you work, and such as relate immediately to the patient. Something is perhaps owing also to the school with which you are or have been connected. You are at least afforded an additional motive for guarded conduct by the remembrance that you are its representative to the public, the exponent of its methods, and that, according as you behave yourself well

or ill, credit or discredit is reflected upon the entire school. It may at first glance seem somewhat strange to assert that your own personal duties should take precedence, but a little reflection will show that whatever theories of self-devotion you may entertain, and however willing you may be to sacrifice your own comfort to the welfare of your patient, disregard of the duties to yourself will sooner or later incapacitate you for the fulfillment of all others. You may give up your convenience, your pleasure—indeed will be perpetually called upon to do so as the inevitable claim of the work you have chosen—but your health you have no right to risk. Remember that self-sacrifice is not always unselfishness, and that the nurse who takes the best care of her own health will be best able to care for her patient. Ill-regulated zeal only defeats its own object; if you wish to be really and permanently efficient, you will take pains not to lower the standard of your own physical condition. Even a nurse is but human; you can not retain your vigor and consequent usefulness without a due allowance of rest, food and exercise. It is your duty, as well as your right, to insist upon securing these, and to take proper time for the care of your own person, and for your meals. You owe it to yourself also, and to the whole nursing sisterhood, to enforce a suitable regard for your reputation, and for the dignity of your position. The maintenance of strict propriety and decorum on your own part will rarely fail to command respect.

To the doctor, the first duty is that of obedience—absolute fidelity to his orders, even if the necessity of the prescribed measures is not apparent to you. You have no responsibility beyond that of faithfully carrying out the directions received. It is true that nearly all orders are conditional, and that circumstances may

occasionally arise which would render literal adherence to the plan of treatment indicated, useless or even injurious, whence the necessity for an intelligent understanding of the case on the part of the nurse. But only the most positive and evident reasons justify any departure from her instructions. In a hospital, where a medical attendant is always within call, there will never be any occasion to assume such responsibility. Here military discipline should prevail, and implicit, unquestioning obedience be the first law for the nurse, as for the soldier. In private practice there is more room for the exercise of judgment, but a good nurse is very careful to do not always what seems to her best, but what it seems to her that the doctor will best approve. Whatever may be your own private opinion of the course pursued, you will, by conscientiously carrying out your instructions, give it every chance of success, and never permit yourself to express an unfavorable criticism upon it. Loyalty to the doctor includes encouragement of the patient's faith in him, so long as he is in charge of the case. The imagination is so largely active in disease that to infuse doubt and distrust into the patient's mind is often to destroy all hope of doing him good. The nurse is a connecting link between doctor and patient, responsible to the one, and for the other, and can do much to promote good feeling between them. Between doctor and nurse there should be the most perfect *entente cordiale ;* let him find you always ready to second his efforts with an enthusiasm equal to his own. You owe to him, finally, the utmost candor and truthfulness. Nothing should induce you to pervert or conceal from him anything bearing upon the case, and, if you should chance to be so unfortunate as to make a mistake in carrying out his orders, be honest enough to

promptly acknowledge, and by that means do what you can to rectify it.

To your patient you owe attention to whatever can affect his health or his comfort. You must be ever on the alert to minister to and even to anticipate his many personal wants. These will vary so much in different cases that few directions can be laid down beyond the general ones for constant watchfulness and thoughtfulness. No two patients are alike, and it is by no means the greatest sufferers who give the most trouble, or make the heaviest demands upon a nurse.

There is one necessity common to all cases, that of cleanliness. Keep him with a clean skin, clean clothes, clean air, and clean surroundings generally, and much will be done toward satisfying your patient's needs. This, of course, includes the strictest attention to your own person, which should be an example of cleanliness. A neat and attractive appearance goes far toward making a nurse acceptable. Your dress should be fresh and tidy, of quiet colors, and with immaculate caps and aprons, if such are worn. The hands especially should be well cared for, kept smooth and warm, with the nails short, and well brushed. Cold or heavy hands will make a patient shrink from your touch ; long, sharp nails are likely to scratch him. Cultivate a touch at once firm and gentle, light and steady.

The prejudice against cleanliness and fresh air, which even in this enlightened age will frequently be encountered, must be combated firmly, though always kindly. It is often a matter of no small difficulty to persuade a patient to submit to having his room suitably ventilated ; and almost equally prevalent among the ignorant, and still more unaccountable, is the dread of clean clothes.

Such notions must not, for the patient's own sake,

be altogether yielded to, neither should they be allowed to give rise to endless dissensions. Cultivate the patient's confidence in your judgment, while making him feel that you are really his friend, ready and willing to consult his preferences on all minor matters, and he will be less likely to suspect you of arbitrary decisions upon others. Never use force where persuasion will avail, even with a delirious patient, and do not make an unnecessary display of authority.

The authority must, however, exist, and will occasionally have to be exercised. You will often be obliged to insist upon things very much against the inclinations of your patient, and to administer remedies when he only desires to be "let alone," and no sentiments of mistaken tenderness should deter you from the performance of duty, even when it is mutually disagreeable. It is from failure in this direction, as well as from defective knowledge, that amateur nursing is often faulty. Hired nursing is now usually the best, and the very worst that which comes from the family and friends of the patient. A calm, steady discipline is needed in the sick-room—that patient, cool control which is far more likely to be exerted by a stranger than by a relative; the very intensity of interest felt for a dear friend often tending to incapacitate for judicious ministrations. You will not allow the longing to comfort and soothe the sufferer to blind you to his real interest, yet be on guard against growing hard and unsympathetic in this rigid adherence to duty. Undoubtedly much familiarity with suffering does to some extent blunt the sensibilities, but the relation between nurse and patient is one of so much dependence on the one side, and so much helpfulness on the other, as to tend to develop what may be described as the maternity of nursing. A sick person is,

for the time being, as a child, and looks to his nurse for a mother's care. From such a relation a certain tenderness of feeling almost inevitably springs, and with it patience to bear with the whims and irritability of the sick.

And a nurse soon learns to make allowance for the close connection between mental and physical states. Invalids are often utterly unreasonable. It is as much a part of some diseases as the physical symptoms, and perhaps as little under control. You will scarcely mind what a sick person says to you, so long as you are sure that he has no real ground for dissatisfaction. But bear in mind that diseased fancies can not be dissipated by argument; there must be either absolute proof that they are unfounded, or an effort to do away with the cause of complaint. At least, do not set a thing down as unreasonable, and so do nothing about it, without thorough investigation. The senses of the sick are often abnormally acute, and a source of discomfort, as a bad odor or an unpleasant draught, may make itself painfully evident to them, while it is quite imperceptible to any one else.

As a rule, whatever tends to keep the invalid quiescent and contented is good for him, all occasions of excitement bad. A tranquil, peaceful, though cheery atmosphere should prevail. As far as possible, let everything appear to the patient to be moving smoothly and easily, no matter what difficulties and annoyances you may encounter. Try to secure for the sufferer repose of mind as well as of body, freedom from anxiety, and absence of all discussions. If he sees that nothing is overlooked or forgotten, he will soon learn to have faith in you, and will gladly leave you to do his thinking for him. Do not call upon him for decisions, even of small

matters, but decide for him. When there is doubt in your own mind as to the best plan to be pursued, consult, not the patient, but the doctor. Frankly acknowledge your ignorance to the person from whom you can get the desired information. There are very few medical men who will not be willing to explain to you what they can, if they are asked at the right time and in the right way.

Try to find out why things are done, to be familiar with underlying principles as well as details of practice. Learn to nurse by reason rather than by rule, for no rule can be laid down to which exceptions will not arise. Do not fancy that after you have been through a training-school you will know all there is to know about nursing; in fact, you will only have been taught how to learn, how to appreciate and profit by the experience which you will get. Every new case will teach you something new.

Apropos of asking advice, the complaint has been made of trained nurses that they have too high an opinion of their own qualifications, and are unwilling to accept suggestions. On the other hand, a lady not long ago remarked of one whom she had employed, "I don't think she knew any more than the rest of us, for all her hospital training, for she followed everybody's advice." It is obviously impossible to suit everybody. A certain amount of adaptability is as desirable as self-reliance, and there may be many little personal matters about which other people must know better than yourself the tastes and habits of your patient. With regard to such things you will of course be glad to receive suggestions and assistance. You will almost always find somebody willing to help in the care of the sick. You will be fortunate if they do not rather hinder. Often the great-

est trial of a nurse is the well-meant interference of the patient's friends. If there are any among them to whom you can leave your patient, you must bear in mind that many details, matters of course to you, are likely to be unfamiliar to the inexperienced, and leave with your relief the clearest and most explicit directions about everything that is to be done. If in writing, there will be so much less room for mistakes. If you have no such relief, and find that your strength is being overtaxed, state the case to the doctor, and ask for help. If, for any reason, you find it necessary to give up a case the care of which you have once assumed, you must at least not leave it until you have seen your place adequately supplied. To leave, unadvisedly, a patient in a critical condition should be regarded as a breach of contract; no conscientious nurse would feel justified in doing it. With a chronic case, of probable long duration, you are under no obligation to stay on indefinitely, but when you wish to go, you will, of course, give notice of the fact in time for other arrangements to be made. Under no circumstances ought you to threaten the patient with leaving him.

In speaking of the relations between nurse and patient, it should not be necessary to more than refer to the fact that a nurse occupies a position of trust, and is perforce admitted to a knowledge of many private affairs. No one with any sense of delicacy can regard as otherwise than inviolably sacred what is thus tacitly left to her honor. It is true that your patients will be largely dependent upon you for society, and that it is often difficult to produce conversation on demand, but it is certainly possible to be bright, cheerful, and entertaining without resorting to gossip.

All these directions will be seen to apply more par-

ticularly to the private nurse. In a hospital, the intimate intercourse of the home nurse with her patient is impracticable and undesirable. Over-familiarity is to be avoided, and strict impartiality preserved, but at the same time the greatest patience and gentleness may be exhibited, and all possible regard for the comfort of the patients.

The work and the position of the nurse are in many ways radically different. She is under constant supervision, and literal obedience to orders will carry her safely through the exigencies of hospital service, but in private nursing a much greater responsibility falls to her share; there is more room for the exercise of her own judgment, and for the development of her own individuality. The qualities required are so diverse as to be but rarely found in combination. An excellent ward manager may succeed but poorly as a private nurse, for the generalship and executive ability which count for so much in the hurry of ward work become valueless in comparison with the tact and adaptability so infinitely more important in the care of a single patient at home. The readiness with which a nurse adapts herself to the habits and idiosyncrasies of a family which she enters for the first time, and the degree of harmony which she is able to maintain with all its members, are more convincing evidence of her good sense and fitness for a delicate position than the most brilliant examination papers. It is in this point that some of our most intelligent nurses and best ward keepers fail when they come to the crucial test of outside practice.

You should in each new place make it a rule to disturb as little as possible the ordinary household arrangements, however little you may find them to your taste, and to make no unnecessary work. Any manifest con-

sideration for the servants will usually be repaid with interest, and is to be recommended as a matter of policy if from no higher motive. But the ideal nurse, the one worthy of her high calling, is inspired by love, not policy, and her sympathies are broad and universal. Such as bear this fundamental law in their hearts need not the reminder that—

"Love never faileth; . . .
Love suffereth long, and is kind;
Love envieth not;
Love vaunteth not itself, is not puffed up,
Doth not behave itself unseemly,
Seeketh not her own,
Is not easily provoked,
Thinketh no evil . . . .
Beareth all things, . . . hopeth all things,
Endureth all things."

CHAPTER II.

The model sick-room—Its choice, contents, and arrangement—The care of the sick-room—Noise, etc.—Hospital routine—The care of a hospital ward—Cleanliness—Order—Economy.

THE comfort and well-being of the invalid depend to so great an extent upon his surroundings that, in consideration of the universal liability to illness and accidents, there ought to be in every well-arranged house an apartment chosen and especially fitted for the use of the sick. But the matter, in spite of its importance, is so generally ignored that it is very rarely that a nurse will have the good fortune to find any provision made for such contingency. You will be called upon to nurse in all sorts of places, and often under the worst possible sanitary conditions. It is important to have a clear idea of what a sick-room ought to be, in order to know how to choose the least among unavoidable evils, and how best to utilize such advantages as you may chance to secure.

A model sick-room is spacious, light, airy, clean, and quiet. The larger the room, the better can it be aired; the more airy it is, the cleaner will it be; and the cleaner it is, the more favorable is it for the recovery of the patient. Space is therefore an important consideration from a hygienic point of view. The sick-room should be located on the sunny side of the house, having

a south or west aspect. Only in exceptional cases, such as inflammation of the eye or brain, is it necessary to have the room darkened, and even then a south room, with the light carefully moderated by blinds and curtains, is to be preferred to a darker one on the north side. Light is a healthful stimulus, and in the majority of cases not only light but direct sunshine is to be desired, partly for the additional cheerfulness which it imparts, but still more because of its actual physical effects. The Italians have a proverb, "Where the sun does not enter, the doctor does," showing their recognition of it as a powerful remedial agent. Have as many windows as possible, certainly no less than two. They should be such as can be opened at both top and bottom, and should reach nearly to the floor, that the patient may easily see out of them. Bars and streaks of light are to be guarded against, as they may occasion a great deal of annoyance.

The sick-room should be as far as possible remote from the noises and odors of the house and of the street. It should be solidly built, having walls thick enough to deaden external sounds, and floors substantial enough not to vibrate under every tread. Where this is not the case, manage, if possible, to have the room above unoccupied. There are numerous advantages to be gained, especially in cities, by having the sick-room at the top of the house. It will be more quiet, in a stratum of purer air, and in case of contagious disease can be more completely isolated. On no account should there be stationary basins in the sick-room itself. If you find there such modern conveniences, cork up the overflow holes, or stop them with plaster of Paris, and fill the basin with water, which must be changed from time to time, or cover it entirely and closely with a board. The

increased security will more than compensate for the extra trouble. Only with the utmost precautions against leaky and defective traps are drainage pipes to be allowed even in the adjoining dressing-room.

The latter is an important adjunct to the sick-room. In it are to be kept the bath and toilet appurtenances. Ample closet room is also desirable, with shelves and drawers for the reception of linen, and of the various medical and surgical appliances which may be needed, but which should never be visible in the sick-room. It is a common, but very reprehensible, practice to have food, medicine, and all sorts of paraphernalia lying about, in a confusion that would be enough to make a well person sick. They should all be banished, except at the moment of actual use. Growing plants, and freshly cut flowers of not too strong odor, may fill their place, if desired. They are quite unobjectionable. The water in which flowers are kept must be daily changed, and the flowers themselves thrown away as soon as they begin to fade. Do everything possible to make the sick-room the brightest and cheeriest in the house. A certain amount of depression is the inevitable accompaniment of sickness. It can not be entirely dispelled, but all counteracting influences should be brought to bear. Dark, gloomy, and unpleasantly suggestive surroundings do much to intensify it.

The walls and ceilings are best of some soft, uniform, neutral tint, as pale green or French gray. Avoid wall-papers of conspicuous tone or regularly recurrent figures. Better than any paper is paint, or a hard-finished surface which can be scrubbed. The monotony may be broken by pictures, but judgment needs to be exercised in their selection. The wood-work should be severely plain and flat. There should be no cornices or mold-

ings, and no woolen curtains, *portières*, or drapery of any kind. All woolen stuffs easily become infected, and are extremely difficult to disinfect. If any curtains are used, they should be of light, washable, and frequently washed material. Carpets even are much better dispensed with. Rugs may be used, as footsteps are noisy on a bare floor, but they must be small enough to be daily removed, shaken, and aired. If there is carpet, it can only be thoroughly swept and cleaned when the patient can be got out of the room, but the surface dust can be removed quite effectively and noiselessly by means of a damp cloth wrapped around a broom. It is not a bad idea, in obstetrical and surgical cases, to cover a carpet with crash, where it is not practicable to take it up.

The essential furnishings of the sick-room are, a bed, a bedside table, an easy chair, a lounge, and a large movable screen. The latter can be readily improvised by fastening a shawl or a sheet over an ordinary clotheshorse. Convenient tables are made with the point of support very much on one side, so as to reach well over the bed. They may be raised or lowered to any desired height. Bed-trays, with a low rim around three sides, may be used by the patient for all the purposes of a table. They are about thirty inches long by fourteen broad, and stand on legs high enough to keep the weight entirely off the body.

A bed-rest, a commode, and similar small conveniences may be desirable, but the fewer superfluous things the better. All the furniture should be of the simplest possible style; elaborate carvings only afford lodging-places for dust, and whatever adds to the difficulty of maintaining absolute cleanliness is to be avoided. Everything should be substantial and in good repair. Ill-fit-

ting blinds, rattling windows, and creaking doors are nuisances demanding speedy remedy.

Many slight and apparently unimportant noises, which are nevertheless peculiarly annoying to the sensitive nerves of the sick, may easily, with a little care and forethought, be done away with. Keep rocking-chairs out of the room. Avoid wearing clothes that rustle, or shoes that squeak. If coal must be put on the fire, bring it in wrapped in a paper, and lay it on, paper and all. Use a wooden rather than a metallic poker to rake the fire. Noise which is understood and inevitable is far less trying than a much slighter noise, unexplained or unnecessary. Intermittent is more hurtful than continuous noise. Sudden, sharp, and jarring sounds are especially bad. A good nurse never startles her patient. Even in such a small matter as your way of addressing him, be considerate of his weakness. Do not speak abruptly from behind him, making him first jump, then turn round, then ask what you said, but get his attention before speaking, and use a clear, distinct, though not necessarily loud, voice. Whispering in the sick-room, or just outside the door, is one of the worst of the many distressing forms in which the solicitude of the patient's friends will manifest itself. There are few things more tormenting, though it is usually done with the very best intentions of not disturbing him. A low, distinct tone, when conversation is necessary, will seldom annoy. Whispering always will, as will any sound which strains the attention, or creates a sense of expectation. It should be laid down as a rule that whatever the patient is not intended to hear should not be said in his presence.

These seem very small points to dilate upon, but good nursing depends largely upon attention to details

so apparently trivial that a careless person would never think of them, but which yet make or mar the comfort of the invalid. Small things assume momentous proportions in the limited interests of a sick-room. Nothing is insignificant or beneath notice which has any bearing upon the welfare of the patient. To keep the sick-room in a proper condition is as important a part of your care for him as more personal ministrations. A nurse ought not to be expected to do housework, which can be equally well done by some one else, for she has enough other and more fitting demands upon her time and strength, but, in order to direct others, she should know how it ought to be done. The work of a nurse in a private family varies so much with circumstances that its limits can not be precisely defined. The position is a somewhat anomalous one, and, with all due regard for your professional dignity, surely you will rather perform the most disagreeable and commonplace tasks than let them go undone to the detriment of your patient. With the extra work which sickness always brings, there is often insufficient service, and the nurse will be obliged to share the burden. You must be prepared to encounter many inconveniences; your ingenuity as well as your patience will often be taxed; and sometimes you will find yourself looked upon as a kind of machine, expected to run night and day without ever needing to be wound up.

In a hospital there are no difficulties of this sort. Everything is planned with reference to the needs of the sick; the most convenient appliances are at hand as a matter of course; the duties of each person are definitely assigned, and the work as much as possible simplified by systematic arrangement and regular hours.

In a ward of twenty patients, with the average num-

ber of bad cases, there will be usually three nurses, with a maid or an orderly to do the scrubbing and heavier work. The head nurse has the oversight of them all, and, present or absent, is responsible for everything done or left undone. Some assistance may be given by the convalescent patients, though it is an uncertain dependence. Care must, of course, be taken not to overtax the strength of any one, but they can be made useful in a good many little ways, and are usually glad of some light occupation. Their work is, however, little to be relied upon, for a patient able to do much is likely to be soon discharged.

Ward work, in spite of its variety, may, if skillfully planned and systematized, be reduced very much to a routine. Minor arrangements vary in different institutions, but the fundamental principles of the nursing service are everywhere the same. The nurses appear in the ward, ready for duty, punctually at the appointed hour. The patients should previously have had their morning toilets made, under the direction of the night nurse, that there may be no delay in getting them ready for breakfast. The head nurse first reads the report of the night, and ascertains any changes that there may be in the condition of the patient, or in the orders given. Unless she has very competent assistants, she will then herself attend to the care of the worst cases among the bed-patients, and to the giving out of the medicines. There are also all the beds to be made, the temperatures to be taken, soiled clothes to be collected and sent to the laundry, the ward generally to be cleaned up, and the diet distributed. All these tasks are divided as the head nurse may direct. One assistant must take charge of the breakfast, see that each patient is served with his appropriate allowance, and those fed who are unable to

feed themselves. Convalescents should not be allowed to begin until all the bed-patients are attended to. After the meal is over, the dishes are to be picked up and carried out, and the ward made ready for the doctor's visit. All this takes time, for sick persons can not be hurried. The nurses must all be ready to attend the staff upon their rounds. The head nurse must be informed as to the condition of every patient under her care, ready to answer any questions that may be asked. She must be provided with a note-book, in which to take down on the spot whatever orders are given, and she should call attention to everything which it is important for the doctor to know. If there are three nurses in the ward, the senior goes on in advance of the staff, and expedites their progress by preparing each case for ready examination. She will know from the nature of the case what is to be done; the clothing must be conveniently arranged without undue exposure; sometimes it will be necessary to put screens about the patient, or to remove the dressings from a wound. The junior nurse, or probationer, following them, restores things to their previous orderly condition, so that, when the rounds are completed, the ward will not be in a state of general confusion. Provision should be made for the doctors to wash their hands before they leave the ward. After they have gone, the head nurse will explain to her assistants the orders which she has received, assigning to each such part of the work as she wishes her to do. The rest of the morning will be occupied with the execution of these orders. The nurses take turns in going to their own meals, that the ward may never be left without a responsible attendant. The senior and junior nurses will together attend to the distribution of the patients' dinner; it is usually too much

for either to manage alone. One must, however, always be held responsible for the state of the dining-room. She must see that it is in order before she leaves it, the dishes washed and put away, the refrigerator clean, sweet, and locked. The dumb-waiter should be kept closed when not in actual use, and no article except food, and dishes for food, ever be allowed on it.

After dinner the great press of work is likely to be over, and, after the ward is once more in order, the nurses may each in turn be allowed an hour's absence for recreation. This hour ought, more frequently than it is, to be spent in the open air. Later in the day will be evening temperatures to be taken, supper to be given out, and preparations to be made for the night.

Besides these enumerated, are numerous other things to be done daily. Old patients are going, and new ones continually coming in all stages of dirt and dilapidation.

When a patient is admitted, he is at once put to bed, unless by special permission to the contrary. If a stretcher-patient, his coming will have been previously announced, and a bed prepared to suit the nature of the case. A list of his clothes must be made, and carefully verified. Such as need it are to be sent to the wash, or to the disinfecting tank, others put away in the closet belonging to his bed. He must have a bath, if able, and, very possibly, also be treated with some parasiticide. His temperature is to be taken, and any marked symptoms reported. In a susceptible person, the change of surroundings, and consequent excitement, may have a considerable effect upon the pulse, respiration, and even temperature; it is, therefore, advisable to take them not only immediately upon the entrance of the patient, but again a short time—say an hour—later. He will have

light, usually fluid, diet only, until special directions are received.

In the same way every event brings its own demands for more or less time and attention. After twelve hours, the day nurses will be relieved by the night nurse. One at least of the former must stay on duty until the latter comes, even if the day's work should happen to be quite done earlier. Connections between them must be perfect, and the ward never be left without a nurse in it, or within call. The night nurse is subordinate to the head nurse of the ward, and takes the orders from her. The doctor, in making his evening rounds, will give additional directions. The duty of the night nurse is important, for all seriously sick people need great care at night. She must try to get the wards quiet and the lights down early, and to do her work with as little commotion as possible. Before she goes off in the morning, besides making a verbal report to the head nurse, she must prepare for the doctor a written record of everything noteworthy which has occurred during the night.

For work to go on smoothly, there needs to be the greatest harmony and accord among all the nurses. They have devoted themselves to a common object, with which no petty personal feeling should ever be allowed to interfere. No nurse is fit for her position who will sacrifice to any narrow jealousies or disputes the working order of her department.

All that has been said of the care of the sick-room applies with even stronger emphasis to the hospital ward, where a greater number of lives are at stake. The first requisite is scrupulous cleanliness. No amount of ventilation will keep the air sweet in a ward that is not clean. It has been sagely remarked, that "dust in a

ward is not only dirt but danger." It consists largely of organic matter, which must be taken away, not merely stirred up and redistributed. Nothing really removes dust but a damp cloth or sponge, to which it will adhere. To sweep properly a room full of people requires more care than a maid will, without special oversight, be inclined to give. The ordinary flourish of brooms raises a cloud of dust, and drives it over the beds, and into the eyes and mouths of their unfortunate occupants, who can not get out of the way, but can only stay and be choked. On a hard floor, soft-hair brooms should be used with long strokes, and the dust frequently taken up. Water for washing floors should be often renewed, and not too freely used. Vigorous rubbing with a cloth or carriage sponge, wrung out nearly dry, will do more good than a deluge of dirty water. During the sweeping, the rugs should be taken out of doors and shaken. Some dust will of necessity escape into obscure nooks and corners, all of which should, therefore, be under strict supervision. Dusting, except of metallic surfaces, must be done with a damp cloth, followed, if need be, with a dry after-polish. The feather-duster in common use is worse than worthless, except to bring down to an accessible height dirt that is out of reach, for it serves only to scatter the dust and make it less conspicuous, a disadvantage rather than a desideratum.

All vessels must be removed from the ward immediately upon use, and thoroughly cleaned. A slop-pail should never be brought into the room; all waste matter, even water used for washing, should be at once carried out. Communicating passages, bath-rooms, and closets, as well as the ward itself, must be under strict supervision, for it is of little use to have an immaculate ward, if every time a door is opened it gives admittance

to a gust of unclean air from some dusty or ill-ventilated lavatory. To keep the lavatories free from odor needs special care. Water-closets should be thoroughly flushed, and occasionally have some disinfectant poured down them. Any failure of water supply, or discovery of imperfect drainage, must be at once reported to the proper authorities. There should be not a hole or corner anywhere which will not bear the most rigorous inspection. All basins, bath-tubs, and metal fixtures must be kept bright and shining.

Remove from the ward promptly all soiled clothes. Before sending them to the laundry see that no pins are left in them, that they are distinctly marked with the name or number of the ward, and, if private property, with the name of the patient. Roll very dirty things in a bundle by themselves. A list must be made out, of which a duplicate is retained, for comparison when the clothes are returned.

Cleanliness, everywhere "next to Godliness," takes precedence in a hospital ward of all other virtues: "Order, heaven's first law," has a secondary, but still an important place. A well-kept ward is characterized by neatness and uniformity. A little care to have things straight adds much to its attractiveness of appearance. The beds should be in an exact line, curtains at an equal height, chairs, tables, and rugs at the same angle to each other. Few things give a ward a more disorderly effect than clothes tucked about the beds or tables, or flung over chairs. The bedside tables must be daily inspected, and no rubbish allowed to accumulate in them. Unless carefully watched, patients are very apt to stow away, in the nearest place, dirty clothes, relics of meals, dead flowers, apple skins, or any refuse that may need to be disposed of. Refuse-cans should be provided,

always of metal, with tightly fitting covers. They should never under any circumstances be allowed to stand uncovered. They will need to be scoured out every few days with some strong disinfecting solution.

Nothing should be thrown out which can be in any way utilized. If supplies are liberally furnished, do not, therefore, think that little bits are of no account, but make them go as far as possible. Hospital supplies are of an expensive nature, and it is the nurse's duty to see that nothing is wasted. See also that supplies are well kept up; everything expected to be on hand renewed before it is quite exhausted. In a surgical ward, the dressing-basket should stand in some accessible place, furnished with everything likely to be called for in an ordinary dressing.

To keep things in order, it is necessary to work neatly, and clear up after each performance before undertaking another. Much confusion will be avoided by getting everything ready, even to the smallest detail, before beginning any process. Have a clear idea in mind of what is to be done, and never get excited. You will then be able to be prompt without hurrying, quiet and methodical in movement, and will doubtless soon achieve a reputation as a neat and skillful nurse.

CHAPTER III.

Beds—Bedsteads—Bedding—Bed-making—How to move a patient from one bed to another—Pillows—Bed-rests and other appliances—Air and water beds—The care of a bed—Bed-sores—prevention—symptoms—treatment.

It is the common notion that anybody can make a bed, and possibly also that it is of very little account exactly how a bed is made. To a thoroughly healthy person, who will sleep soundly all night and turn out of bed as soon as he wakes, it does not indeed matter much, although he spends a third of his life in it, whether his bed be well or ill made, so long as it is clean and warm. But the invalid, whose confinement to it is more or less permanent and compulsory, and the acuteness of whose sensations is aggravated by disease, finds few things more seriously affecting his comfort than the condition of his bed. To know how best to arrange and take care of it is very important for the nurse. When you take charge of a private patient, who has been till then cared for by home talent, in nine cases out of ten the first thing you will find it necessary to do will be to reconstruct the bed, and often the skillful rendering of this simple service will at once call forth the gratitude of your patient, and gain his instant recognition of your efficiency.

Let us first consider the frame upon which the bed

is supported. Wooden bedsteads should not be used for the sick when anything else can be obtained. The best are those common in our hospitals, made entirely of metal, iron or brass, with a mattress of woven wire. These can be kept in a clean and wholesome condition more easily than any other, and are for use in the sick-room far superior to those ordinarily found in private houses. They are non-absorbent, and afford no hiding-places for vermin, which, in spite of all precautions, will sometimes appear, even in well-regulated homes, and to which public hospitals, with their miscellaneous class of patients, are especially liable. The first sign of a bug should be the signal for a most careful search and extermination, for, once having gained a foothold, they multiply, as every housekeeper knows, with alarming rapidity. Corrosive sublimate is the surest remedy, but, being a violent poison, it must be handled with caution. Another exterminator, recommended for all kinds of vermin, has the following formula: Aqua ammonia, two ounces; saltpetre, one ounce; soap, scraped, one ounce; soft water, one quart.

Bedsteads should be on castors, so as to be easily moved, and should be no heavier than is necessary for strength. The best dimensions for a bed in which a sick person is to be cared for, are six and a half feet long, three feet wide, and two, or at most, two and a half, feet high. If it is too wide, the nurse will be unable to reach the patient without getting upon the bed herself, which is always an objectionable proceeding; if it is too high, it adds to the difficulty of raising the patient, and makes it harder for convalescents to get in and out.

Over the wire springs will be placed a mattress of some kind. For this various materials are used—hair, straw, jute, compressed sponge, etc. Straw has the ad-

vantage of cheapness, and the ticks can be frequently emptied, washed, and refilled, while the old straw is burned; but hair of good quality makes the most comfortable bed, being at once firm and elastic. It can be cleaned and subjected to a disinfecting temperature without injury. Hospital mattresses are frequently made in sections, as they wear more evenly, and a part can be renewed without taking to pieces the whole. When this is done it is well to have the sections tacked strongly together, as they are otherwise apt to slip apart, leaving an uncomfortable crack under the patient. Still, an expert bed-maker will get the under sheet tight enough to hold them in place.

A feather-bed is a thing never to be thought of in connection with the sick-room, being a combination of every objectionable quality. Its use is nearly equivalent to putting the patient into an immense poultice; it is warm, soft, absorbent, and consequently nearly always damp. Unless it is stuffed unusually full the patient sinks at once into a hole; it is impossible to keep it level, and, if it once gets wet, there is no way of renovating it. Once in a while one comes across some old lady, who, from long usage, has become so attached to her feather-bed as to fancy that she can not sleep on anything else. If she is able to leave it daily, to have it shaken up and rearranged, it is scarcely worth while to struggle against the prejudice; but if she is likely to be confined to bed for any length of time, the first thing to be done is to persuade her to give it up, for, offering as it does every condition favorable to the development of bed-sores, it will be a source of danger as well as of discomfort. After a few days' trial, even the most persistent lover of the feather-bed will usually be convinced of the superiority in sickness of an unyielding support.

If not, and the sufferer still clings to her old habits, then we are sorry for the nurse, for she has a hard task before her. In many surgical cases it is of great importance that the bed be kept flat and level. Where extra firmness is required a thick board, the size of the mattress, is placed under it. This is known as a fracture-broad. It should have holes bored in it for ventilation.

The propensity of hospital patients to stow away their personal property under the mattresses should be provided against. Give them other safe and convenient places in which to put their things, and insist upon having the beds kept clear.

For sheets, cotton is a better material than linen, except, perhaps, in very hot weather Linen, being a good conductor of heat and a rapid absorber of moisture, has a tendency to chill the surface of the body; cotton does not conduct away the heat so rapidly, and is, therefore, safer for the use of the sick. Sheeting comes in widths adapted for beds of different sizes. Whatever the width of the sheet, the length should exceed it by three quarters of a yard. There should not be a seam in the middle.

In making the bed spread the lower sheet smoothly and tightly over the mattress, tucking it in securely on all sides. It can be made still more firm, if the bed is being prepared for long occupancy, by fastening it with safety-pins to the mattress. Be careful that the sheet is put on straight, for, if not, it will form wrinkles, and, if pinned, be likely to tear. There should not be a blanket between the under sheet and the mattress. It may be necessary to protect these from discharges by a piece of rubber cloth, covered by a second folded sheet, or a narrower "draw-sheet." The latter, as its name implies, may be easily drawn from under the patient

with very little disturbance to him, while another is at the same time slipped into its place. The water-proof and draw-sheet must both be stretched as tightly as possible, and well tucked in. When rubber sheeting can not be obtained, enameled cloth or oiled muslin will answer the purpose, or, in an emergency, heavy brown wrapping-paper is said to be a fairly good substitute. The rubber, being only for the protection of the bed, should not be retained longer than is really necessary, as the patient may be more comfortable without it.

The upper clothing should be enough for warmth, but no more; for too much warmth is enervating, and too much weight impedes respiration. There will be first another sheet, tucked in well at the foot, that it may not be pulled out of place, but left long enough to turn down for some little distance over the blankets. A woolly surface coming in contact with the face is usually very disagreeable, though, in some cases, where there is special need for warmth, as in acute rheumatism, the patient will be put directly between the blankets. Blankets of good quality are the best bed-covering, being warm, and not weighty. They should come up high enough to tuck in snugly around the throat, if desired; but the patient should not be allowed to sleep with his head under the bedclothes, breathing the noxious emanations from his body. Several thin coverings will be warmer than a single one of equal weight, because of the non-conducting air inclosed between them. Heavy quilts and counterpanes will be found burdensome. The old-fashioned cotton comforter is heavy, and not proportionately warm. Eider-down quilts, or duvets, are luxuriously light and soft, but can not be well cleaned or disinfected. A patient sleeping under one should be carefully watched, as it is likely to in-

duce excessive perspiration. If one desires to avoid the weight of a counterpane, a clean white sheet will take away the unfinished look of the blankets alone, and at the same time protect them from dust. Counterpanes, being chiefly ornamental additions to the outfit of the bed, may as well be taken off at night, and so kept clean the longer. An extra blanket will be needed toward morning, and should always be at hand. Blankets, as well as sheets, need washing whenever they are stained or dingy, or are taken from infected beds. Fresh blood-stains can be removed from blankets or ticking by spreading over the spot a paste of fine starch or wheat flour, and allowing it to dry. If, upon rubbing it off, it is found that the stain has not entirely disappeared, a second application will be pretty sure to be effectual. Blood and other stains can be removed from rubber by Labarraque's solution (of chlorinated soda).

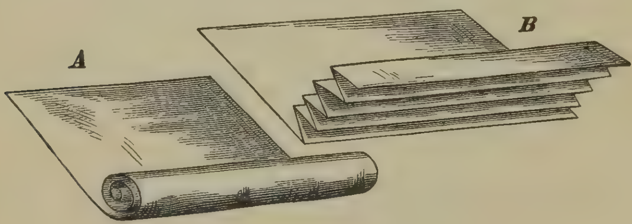
The beds in a hospital ward should be made to look as nearly alike as possible, the surfaces even, the spreads equally far from the floor on both sides, and with the corners arranged at the same angle. In some hospitals the convalescents make their own beds; but a great lack of uniformity results, detracting much from the neat appearance of the ward.

The sick-bed should stand far enough from the wall to be accessible on all sides. It should be in such position that its occupant can look out of the window, but whatever artificial light is employed is best behind him.

Nothing should be allowed under the bed, nor should there be any drapery to prevent the free circulation of air below it. The bed should stand steadily, so as not to be easily jarred. Sitting on the bed, leaning against it, or in any way shaking it, occasions great discomfort to

the patient. Sometimes even the touch of the bed-clothes can not be endured. They may then be supported over the seat of pain by "cradles"—frames of iron or wood made for the purpose. The two halves of a barrel-hoop tied together in the middle will make a fairly good one; or, for a limb, a bandbox, split through the center. Or the clothes may be lifted on a strong cord running diagonally from the head to the foot of the bed.

For changing a sheet or draw-sheet, while the patient is in bed, the method usually recommended is to *roll* the soiled sheet lengthwise, from the edge of the bed farthest from the patient, till it reaches him. The



clean sheet, previously rolled in the same way, is then unrolled over the space from which the first was taken, until the two rolls lie side by side. The patient may then be lifted or turned over on to the clean sheet, the soiled one being removed, and the rest of the clean one unrolled. Instead of rolling the sheets, it is better to fold them alternately backward and forward in the manner illustrated, as the folds lie flatter than the roll, and, when the upper one is pulled, the others readily follow. This is more easily manageable, and is less likely to become tangled than the more compact roll. If it is not advisable to move the patient, even from one side of the bed to the other, the mattress may be pressed down,

while the clean and soiled sheets are together gradually worked under his body. The head and feet can be slightly raised to allow the folds to pass. It requires two persons to do this easily.

The upper sheet can be changed with even less trouble and without exposure. Free the clothes at the foot of the bed. Spread the clean sheet outside of them all, over it a blanket, and tuck them in securely before removing the first set. Finally, slip these from under the clean sheet, and carry the blanket out to air. If the extra blanket is not at hand, the clean sheet may be rolled or folded across its width, tucked in at the bottom, and unrolled toward the top *under* everything else, the soiled sheet being afterward pulled down and removed at the foot. See that the blankets are made smooth and straight. If they are not wide enough to tuck in well at the side, the upper one may be laid on across the others; otherwise they will all be dragged off on one side when the patient turns over.

The common custom of taking a crumpled upper sheet and putting it on in place of a soiled lower one is not good economy in sickness. If there can be only one clean sheet given, let it be the one on which the patient has to lie. His comfort, unless he has an unusual regard for appearances, depends more upon having a smooth, fresh surface under him than upon having it where it will show the most. The sheets ought to be changed frequently—at least one every day, if only to be aired and used again. See that all clean articles likely to be needed are at hand before removing the soiled, and that they are well aired and warmed. Dampness in bed or bedding is always dangerous. If the bed feels close and unpleasant, it may be to some extent aired by lifting the clothes at the edge of the bed, and fanning them

up and down a few times. This may be done without danger of chilling the patient, and will, especially in warm weather, be found refreshing.

If you can not change the sheets, pull them as tight and as straight as possible, which will give a fresh feeling to the bed. The best possible arrangement is to have two of the narrow beds above described, from one to the other of which the patient can be daily moved. Each is to be supplied with its own complement of bedding, one set being aired while the other is in use. Even a very sick person can be easily moved by two attendants, one standing at his head and the other at his feet. The second bed must be placed as closely as possible by the side of the first, then the sheet upon which the patient lies is lifted by the corners and is carried steadily over. He must be lowered slowly, gently, and without jarring. Then slip from under him the sheet on which he has been moved. Be sure, before you begin, that this is a strong one, with no rent in it that may give way. Two poles or long brush-handles, rolled tightly into the sheet to within a few inches of the patient's body, will convert it into an impromptu stretcher, upon which he may be kept perfectly horizontal during the moving process.

If the two beds are of exactly equal height, you may be able to accomplish the transfer alone. One way to do it is to pin a stout rubber cloth to the bed from which you wish to move your patient, letting it lap over on to the other so as to cover the intervening crack and give a level surface, across which he may be drawn by means of the sheet on which he lies. Or, having the two beds side by side, pull the mattress with the patient on it a little way over the other. He may then be slid down on to the fresh bed, and the first taken away. This is easy if the mattress is not too thick and heavy.

If the patient is light, the easiest way of all may be to carry him, putting one arm under the knees, and with the other supporting the back just below the shoulders, but this is scarcely advisable except in case of a child.

All this is assuming that the sick person is perfectly helpless. If he can help himself a little, it of course makes the matter still less difficult. To move him into another bed, although it seems like a great undertaking, is really little more trouble than to rearrange his own under him, while it makes him more comfortable, and gives an opportunity to thoroughly air each bed. There are a few surgical cases—fracture of the thigh, etc.—in which such a change is impracticable, and in a private house one is not always able to command hospital conveniences. Where one wide bed must be used, some of the advantages of two may be obtained by using alternate sides of it. One half may be kept for the daytime and the other for the night.

Be especially generous with pillow-cases. Have clean ones often. Pillows need to be frequently changed, or shaken up and turned, as they soon become hot and uncomfortable. In doing this, lift the patient's head carefully and let it rest on one arm, while with the other hand the desired arrangement is effected. Then lay him back gently; do not let his head drop with a jerk.

To prop up a patient with pillows, first see that one is pushed well down against the small of his back, and then put each additional pillow behind the last. This will keep them from slipping, and will support the back without interfering with the play of the lungs. A single long pillow, stuffed hard, thick at one end and gradually diminishing toward the other, like a wedge,

is better for this purpose than half a dozen of the ordinary kind. One or two softer ones may be placed on top of it. Wooden bed-rests are made, and, for temporary use, a straight-backed chair, turned upside down, is very good. Bed-rests of netting, secured at each end to the bedstead, are said to be very cool and airy. They can be so arranged as to swing the patient quite off the bed. For a weak patient, with an inclination to slip down to the foot of the bed, Cullingsworth's roller-pillow is valuable. This is a cylindrical cushion, some four inches thick, with a strip of stout webbing at each end fastening it securely to the head of the bed. The patient sits upon this, as it were, and is supported by it. There are an endless number of invalids' beds made to tip up at various angles, and several forms of patent apparatus for lifting and holding up the patient while the bed is being arranged under him. A very simple and useful appliance for helping the invalid to assist himself is a strap with a handle, pendant from a hinged crane over the bed, or from a ring in the ceiling.

Small pillows of various sizes and shapes are frequently serviceable. Rubber air-cushions are especially comfortable. They should be smoothly covered, and the cover should be sewed, not pinned, on. In some cases an air- or water-bed will be called for. They are both made of rubber; the former is filled by bellows, the latter is connected with a hose. The air-mattress may be placed on an ordinary bedstead, but the water-bed lies in a wooden trough. An old blanket, or cloths, must be put under it to keep it from sticking. The water with which it is filled should be at a temperature of about 70° Fahr. Cover with a blanket before putting on the usual bedding. Care must be taken to avoid pricking water- or air-cushions, or beds.

Crumbs in a bed constitute one of the minor miseries of sickness, and can not be too carefully looked out for. There should be a regular crumb hunt after each meal. A bed well cared for is evidence of a good nurse. From neglect or ignorance of its proper management very serious consequences may arise in the form of bed-sores. These result from continued pressure upon prominent parts of the body, and may vary in degree from slight abrasions of the skin to deep wounds. They appear most frequently upon the lower part of the back, the hips, shoulders, elbows, or heels, but may develop wherever the conditions are favorable. There is liability to them in all cases of long confinement to the recumbent posture, especially where the vitality is much lowered —as in paralysis, fevers, and old age. Very heavy and much emaciated patients are alike predisposed to them, and they are among the most trying complications of surgical cases, where motion is restricted. Bed-sores are frequently occasioned by bad nursing, and the cases are rare in which a good nurse can not avert their formation. They are more easily prevented than cured when once established. Preventive measures consist in keeping the parts thoroughly clean, and the surface under them dry and smooth, in hardening the skin, and in relieving so far as possible the local pressure. This precautionary treatment should be commenced at the beginning of any long sickness, without waiting for manifest signs of danger. The parts most subjected to pressure must be frequently washed with soap and water and thoroughly dried. A draw-sheet should be placed under the patient, which must be changed as often as it becomes damp from any cause, and the greatest pains must be taken to keep it free from wrinkles, crumbs, and inequalities of any kind. The patient's clothes must

not be permitted to form folds or creases under him. The skin may be hardened by bathing it several times daily with alcohol, brandy, or eau-de-Cologne, or a solution of bichloride of mercury in alcohol, two grains to the ounce. Follow this by rubbing in well a small quantity of some simple ointment, to keep the skin supple. Finally, dust the parts with some fine powder, to absorb the moisture of the skin. Oxide of zinc is perhaps the best. Lycopodium powder is very fine and soft, but has the disadvantage of staining the bedding. It must be borne in mind also that it is highly inflammable, and must not be used in the vicinity of a lamp. Fine starch or the ordinary toilet powder used for infants will answer.

Where the danger is extreme, or the skin is already abraded, it may be protected by covering it with strips of soap-plaster, or by the application with a broad brush of a single coat of flexible collodion, or solution of gutta-percha. The pressure may be relieved by frequent changes of position, when such are practicable, by circular pads or air-cushions, or, where the tendency is very marked, by the use of a water-bed. The latter equalizes the pressure, and is, in case of paralysis, or prolonged incontinence of urine, the only efficient safeguard.

The first symptom of a bed-sore evident to the patient is usually a pricking sensation, or a feeling as if he were lying on something rough. Or there may be no subjective indication whatever. A patient may be delirious, paralyzed, or too weak to complain, and a bedsore be far advanced before it is discovered, unless constant vigilance has been exerted in this direction. On this account daily and careful examination should be made of such parts as are especially subjected to press-

ure, and the first discovery of reddening or roughening of the skin, or of pain on pressure, should be accepted as a warning of serious import. If these symptoms pass unnoticed or uncared for, the discoloration will become deeper, and the inflammation progress until sloughing ensues.

After a bed-sore is actually formed, its treatment belongs properly in the province of the surgeon, but it is often delegated to the nurse. After the skin is broken it is customary to discontinue the use of spirit, or to dilute it, as otherwise it causes pain, and to dress with oxide-of-zinc ointment or vaseline. A mixture of tannic acid and oxide of zinc, a scruple of each, worked up into an ointment with an ounce of vaseline, is sometimes recommended. When a slough has formed, its separation is hastened by the use of charcoal or chlorinated poultices. As it becomes detached, it almost invariably reveals greater extent of injury than its superficial appearance would have led one to anticipate, often laying bare the deeper tissues even to the bone. Poulticing should not be continued longer than is necessary to remove the gangrenous portion, as it tends to soften and break down the neighboring parts.

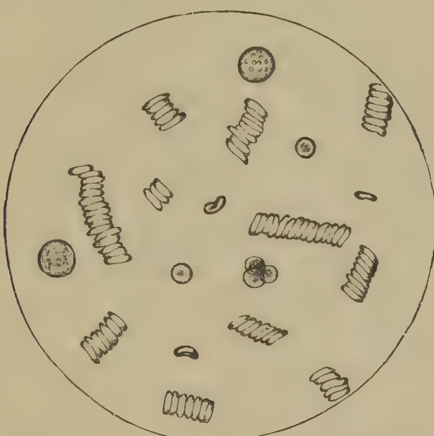
Brown-Séquard advises alternate applications of heat and cold, an ice-bag for ten minutes, followed by a warm poultice for an hour. After the separation of the slough, the resulting ulcerated surface is treated with some stimulating and disinfecting remedy, as balsam of Peru, tincture of catechu, or carbolic acid 1 to 40, applied on lint, only within the limits of the sore. An excellent application at this stage is that known as Wood's mixture, consisting of equal parts of powdered catechu, red cinchona and gum camphor, mixed into a thin paste with balsam of Peru. This makes an indeli-

ble stain. Tannic acid also stains. Iodoform, either in powder or in the form of an ointment, may be used. Cover the lint with a piece of oiled muslin or rubber tissue, of a little larger size, and confine the dressing in place by adhesive strips, not by bandages. It must be renewed at least once a day, and the surface of the sore washed with some disinfectant solution before it is re-applied. Remove all pressure by circular pads. The patient's strength must be supported, and the circulation improved as far as possible, as the immediate cause of bed-sores is defective nutrition. If neglected, they may result fatally, as the constant discharge may prove too great a drain upon an already debilitated patient, or pyæmia may supervene from the absorption of septic matter into the blood.

CHAPTER IV.

The blood—The heart—The blood-vessels—The general circulation — Pulmonary circulation—Collateral circulation—The pulse and its variations—Vital temperature—Local temperature.

In view of the definition of health which we have quoted—*the perfect circulation of pure blood in a sound organism*—it becomes desirable for us to know some-



Red and white corpuscles of the blood. Magnified.

thing of the nature of pure blood, and of the means by which its circulation is carried on. It is the most abun-

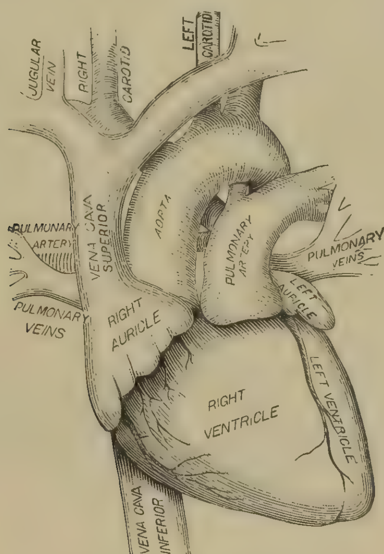
dant as well as the most important fluid of the body, pervading nearly every part of the system; upon its presence and its unceasing motion life as well as health depends. It appears to the naked eye as a simple red fluid, but when examined under the microscope it is seen to be made up of a multitude of little solid bodies floating in a clear colorless liquid. They are called corpuscles, literally *little bodies*, and the liquid in which they float is known as plasma. The plasma is made up of serum and fibrin. The corpuscles are mostly of a yellowish-red hue, and it is from their vast numbers that the blood derives its red appearance. There are some white ones; they are larger than the red, and of a different shape, but are comparatively few in number.

The blood while it circulates through the body is, though somewhat glutinous, perfectly fluid, but, upon removal from its natural surroundings it exhibits a well-known tendency to coagulate or solidify. The fibrin of the plasma separates itself from the serum and entangles the floating corpuscles into a mass. This peculiarity affords protection against undue loss of blood, for dangerous hæmorrhage would follow even a slight cut did not the clots thus formed effectually close the injured blood-vessels and prevent further escape of the vital fluid. Occasionally this coagulation of the fibrin takes place while the blood is still in motion through the vessels, obstructing the circulation very seriously. This is called thrombosis. A clot so formed is called a "thrombus," and when detached and carried into a distant artery or capillary it constitutes an "embolus."

The office of the blood is to convey nutrition to all parts of the body, and to remove its waste material. The way in which it circulates was discovered, early in the seventeenth century, by William Harvey. The pro-

cess is carried on by means of the heart and blood-vessels of three distinct kinds—arteries, which carry the blood away from the heart, veins, which bring it back to the heart, and capillaries, connecting the two.

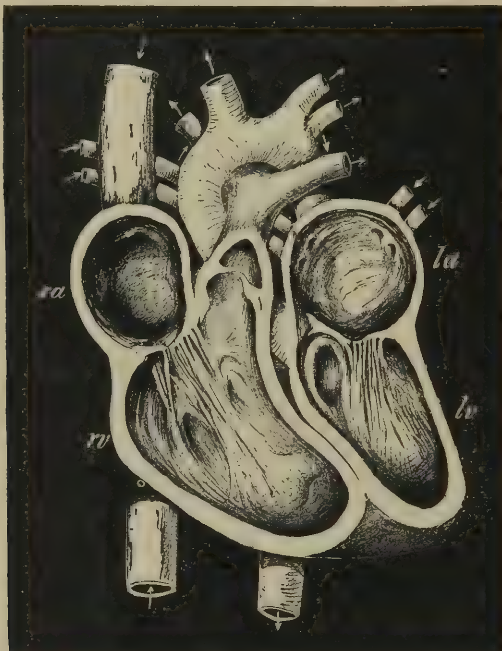
The heart is a pyramidal organ, situated nearly in the center of the chest. The apex, pointing downward, forward, and to the left, can be felt between the fifth and sixth ribs. The base is on a level with the upper



Heart and large blood-vessels.

border of the third rib. The base is fixed, but the apex is freely movable. The heart is composed of muscular fiber. It is enveloped in a fibro-serous membrane, called the pericardium, which secretes a lubricating fluid enabling its movements to be accomplished without loss of

power by friction. It is hollow, and is partitioned into four cavities or chambers of nearly equal capacity, two at



Cavities of the heart: *ra*, right auricle ; *rv*, right ventricle ; *la*, left auricle ; *lv*, left ventricle. The arrows indicate the course of the blood.

the base called auricles, and two below termed ventricles. There is no opening between the ventricles. A valve between the two auricles closes at birth and gradually disappears, after which there is no longer any connection between the two sides of the heart. The left side always contains pure, the right side impure, blood. If the valve between the two auricles fails to close when

independent circulation is established, or soon after the impure blood mixes with the pure, giving the skin a blue tinge. A child in this condition is called a "blue baby," and rarely lives long. But between each auricle and its corresponding ventricle there is an orifice, guarded by a valve, which permits the passage of fluid in but one direction—downward. The valve between the right auricle and the right ventricle is called the tricuspid valve; that at the left auriculo-ventricular aperture, the bicuspid, or, more commonly, the mitral valve. Each ventricle has also another opening, provided with a set of "semilunar" valves, connecting it with a large artery, the aorta on the left, and the pulmonary on the right. The auricles also have other openings through which the blood flows into them from the great veins, but they are not supplied with valves. As the auricles become filled, they contract, and the blood, following the line of least resistance, is forced into the ventricles. They in turn similarly contract, forcing it on into the arteries, regurgitation being in each case prevented by the intervening valves. The sounds heard upon auscultation are produced by the closing of these valves. Then follows a pause, after which the contractions are repeated in the same order, and are followed again by the same period of repose, during which the cavities undergo gradual dilatation. The pause occupies about as much time as the two contractions, the entire action less than one second. The state of contraction of the ventricle, or auricle, is called its systole, that of relaxation its diastole. Both sides of the heart act simultaneously.

Let us follow on its course the blood which is expelled by the left ventricle. The semilunar valves open to allow it to pass into the aorta, the main trunk of the

arteries. This ascends from the upper part of the left ventricle for a short distance, then forms an arch backward over the root of the left lung, and passes down into the abdomen, where it is divided into two great branches. In every part of its course it sends out similar branches on each side. These all divide and subdivide into numberless ramifications, extending to all parts of the body, and gradually diminishing in size as they become more and more remote from the heart. The blood receives an impulse from the ventricular systole, which sends it through the entire arterial system. The minute branches of the arteries empty their contents finally into an even smaller set of vessels known as capillaries. To call them *hair-like* is, however, an exaggeration, for they are so fine as to be invisible to the naked eye; still they serve for the transmission of the microscopic blood-corpuscles. They interlace in every direction, making an elaborate network, and finally unite

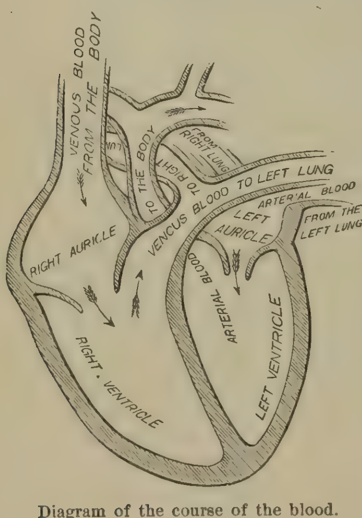


Diagram of the course of the blood.

to form blood-vessels of the third order, the veins, which carry the blood back to the heart. These are at first extremely small, but, by constantly running together, they increase in size as they advance, until they finally all combine into two great trunks, the superior and inferior venæ

cavæ, which empty into the right auricle of the heart. The veins returning to the heart follow closely in the track of the arteries which lead away from it, but they lie nearer the surface.

The smallest arteries and veins are quite similar in structure, but the larger ones have numerous points of difference. The walls of the arteries are composed of three coats, an outer one of strong connective tissue, a smooth inner lining, a continuation of the endocardium, the lining membrane of the heart; between these is a layer which in the largest arteries consists of elastic tissue, in those of lesser caliber of elastic and muscular fibers, and in the smallest of the muscular fibers alone. It follows that the largest arteries have the most elasticity, and the smallest the most highly contractile power. Their walls have sufficient firmness to retain their cylindrical form even when empty. They are always found empty after death. Veins, on the other hand, are less elastic, have thinner walls, and collapse when empty. Many of the veins are supplied with valves, which permit the flow of blood only toward the heart. The capillaries are less complex than the other blood-vessels, consisting of but a single membrane, and that so thin that their fluid contents readily exude. The velocity of the blood decreases as it approaches the capillaries, its progress being delayed by the narrowness and intricacy of the path it has to travel. Time is thus allowed for the assimilation of the nutrient portion of the blood by the living tissues with which it is here brought into intimate contact. As it enters the veins its motion is again somewhat accelerated, though it never regains the speed with which it rushes through the arteries. Having once completed the circuit of arteries, capillaries and veins, the blood is restored to the heart and its gen-

eral or systemic circulation is complete. It has, however, undergone a change in character and appearance during its stay in the capillaries; some of its elements have been appropriated, it has become charged with waste matter, and has lost its bright color. Before it is fit for further use it must be purified and renewed. To accomplish this, and to return to that side of the heart from which it started, it has another journey to take. This, to distinguish it from the former, is spoken of as the lesser, or pulmonary circulation. From the right auricle, into which it is poured by the vena cava, the tricuspid valve allows the blood to flow into the right ventricle, the next contraction of which forces it by the pulmonic semilunar valves into the pulmonary artery, which leads to the lungs. This, like all the other arteries, is subdivided into numerous small branches, and finally establishes connection with a set of capillaries. In the pulmonary capillaries the blood is brought into close relation with the inspired air, and undergoes a process of renovation. The pulmonary veins then carry it back to the left auricle, ready to start again upon its double circulation. It will be seen that in the pulmonary system of circulation the general arrangement is so far reversed that the arteries become the bearers of the impure, and the veins of the pure blood.

The blood-vessels, branching in every direction, communicate in all parts of the body, so that, if the main course of the blood is interrupted, it may still go on its way by making a detour through minor ramifications. Such communication of vessels is called anastomosis. The collateral circulation which it allows is of great surgical value, permitting a large artery to be tied without obstructing the general circulation.

When a larger amount of blood than is natural is

sent to any part the condition is called congestion. The blood-vessels enlarge somewhat to let the increased supply of blood through, but the tissues can not take up the excess of fibrin, and the capillaries become clogged, causing a stoppage or stasis. In this state of things the fibrin oozes out of the blood-vessels into the tissues and is deposited in a more or less solid mass. This is known as exudation of plastic lymph. The congested condition may gradually disappear, and the blood resume its normal flow after merely temporary stasis. This is termed resolution. The excess of fibrin is not, however, always reabsorbed, but remains outside the blood-vessels causing perceptible thickenings. These are adhesions. Exudation of plastic lymph takes place only when arterial blood is obstructed. If there is stasis of venous blood, we have an exudation of serum, which is dropsy. If the determination of blood to the part is not soon relieved inflammation ensues. A large proportion of all diseases, medical or surgical, are inflammatory at some time in their course. Disease is always the result of impaired nutrition, and inflammation has been described as misdirected nutrition. It is characterized by heat, swelling, redness, pain, and exudation of serum. It may terminate by resolution, or by suppuration. In the latter case the white corpuscles work their way out of the blood-vessels and multiply in the plastic lymph, producing pus. When small portions of tissue die from their supply of nutriment being cut off we have ulceration. Death of a large mass of tissue is gangrene. The character of an inflammation and its treatment depend upon its location and its extent.

Each contraction of the heart sends out a wave which distends the blood-vessels, and which they, by their elasticity, carry on through the entire arterial

system. This periodical distention is the pulse. Whereever an artery approaches the surface, the pulse-beats can be felt and counted. The pulse is a valuable guide in disease, as it varies with the condition of the heart, and affords an accurate index of its action. It is usually taken, for convenience, at the radial artery, just above the wrist; if it becomes imperceptible there, it may perhaps still be felt at the temporal, femoral, or carotid, as large arteries retain their pulsation longest. In children, you may feel it best in the temporal artery during sleep. It is often difficult to feel a child's pulse anywhere when it is awake.

To take the pulse accurately, place two or three fingers along the course of the artery, making slight pressure, and count for a full minute, by tens. The rate varies with varying circumstances. Age, sex, food, temperature, position, exertion, mental states, and many other conditions modify it even in health. It is usually more rapid in women than in men, in children than in adults. It is slow during sleep, quicker after taking food, more rapid standing than sitting, and more rapid sitting than lying down. The average rate in a healthy adult is seventy-two beats per minute; in a child, one hundred and twenty. Considerable variations from this standard may, however, be compatible with perfect health. Individuals differ so much that a pulse which would be quite alarming in one subject might mean nothing wrong in another.

Nearly all abnormal conditions of the body have some effect upon the pulse. Increase in the rate is more common than diminution. The character, as well as the frequency, is subject to variations. In a *quick* pulse, each beat occupies less than the usual time—that is, each wave is of short duration relatively to the pause

between. When the volume of the pulse is greater than usual, it is said to be *large* or *full ;* if less than usual, *small.* When the pulse can be easily stopped, it is said to be *compressible ; incompressible* when it can only be arrested with difficulty, or not at all. In an *irregular* pulse, succeeding beats differ in length, force, and character. In an *intermittent* pulse, a beat is now and then lost, the rhythm being otherwise regular. The intermittency may occur at regular intervals, as every tenth or twentieth beat may be lost, or it may be without any regularity. An intermittent pulse is occasionally observed in persons otherwise healthy. It is always a less serious symptom than an irregular one. Other departures from the normal standard, are variously described as *hard* or *soft*, *sharp*, *jerking*, *bounding*, *throbbing*, *shotty*, *thready*, *wiry*, *flickering*, *undulatory*, etc., the names of which sufficiently explain their effect to the touch. In the *dicrotic* pulse, a secondary wave of oscillation becomes exaggerated so as to be felt. An inexperienced person may mistake this for the primary wave, and so be led to count double the real number of beats. This pulse is often met in typhoid fever. In some cases the pulse in the two wrists will be different, and rarely it can be felt in one wrist only. When the beat occurs a little later in one radial artery than in the other it is said to be *retarded ;* this usually indicates aneurism.

The blood has still another function, that of keeping the body warm. Animal heat is generated by continual chemical change, in which the blood is an active agent. The bodily temperature in health remains nearly the same, about 98·4° F., in spite of the variations of the external temperature. The action of the skin keeps the heat from accumulating, and the arteries, under the influence of the nervous system, dilate or contract, and

so assist in maintaining the equilibrium by altering the rate of production to correspond with the loss of heat. Life is secure so long as the production and the escape of heat are evenly balanced.

There is a definite daily cycle of variations, amounting to one or two degrees. According to Quain, the temperature of a healthy adult reaches its highest point between 5 and 8 P. M., and is at its lowest from 2 to 6 A. M. A deviation of more than one degree from the normal standard, that is, above 99½°, or below 97½°, may be regarded as indicative of disease. There is only a range of about twenty degrees within which life can be sustained. A temperature above 108°, or below 93°, will in most cases prove fatal. The danger is in proportion to the distance from the normal, and to the length of time that the condition continues. Temperature below the normal standard is far more dangerous than the same number of degrees above, as the following table shows:

Hyperpyrexia........	106°, and over, extremely dangerous.
High fever..........	103½°—106°.
Moderate fever... ..	101° —103½°.
Subfebrile...........	99½°—101°.
Normal.............	98° — 99½°.
Subnormal..........	97° —98°.
Collapse.....	95° —97°.
Algid collapse..below	95° —again extremely dangerous.

Very high temperatures sometimes occur in hysteria without danger.

Most, though not all, morbid states are accompanied by alterations in temperature, some of which are so typical as to be of great diagnostic value. Rise of temperature above 99½° constitutes fever, or pyrexia. It is occasioned either by imperfect loss of heat or by

overproduction. The amount of heat produced is proportional to the activity of respiration and the amount of oxygen consumed. The pulse is generally accelerated in proportion to the elevation of temperature, though the proportion varies in different diseases. In scarlet fever, for instance, the pulse will be quicker than in typhoid with the same temperature. If the pulse is more rapid than the temperature will explain, it indicates cardiac weakness.

A change of temperature may be the first symptom of disorder, occurring even before indisposition is felt. It is of importance to get this first variation from the normal temperature; and as medical advice is not likely to be called for until more evident symptoms have manifested themselves, every mother as well as every nurse ought to own a clinical thermometer, and to know how to use and read it. She can do no harm, and she may do a great deal of good, by using it upon the first suspicion of a departure from health. A slight variation from the normal is of less serious import in a child than in an adult, unless it is found to be increasing. An increase, beginning each day a little earlier, is a bad indication; a decrease from a high temperature, beginning each day earlier, is a sign of improvement. The daily fluctuations take place also in disease, and are sometimes much exaggerated. Sometimes fever is continuously high, with only the normal amount of variation; or it may be remittent, that is, with a wide range between its highest and lowest points, though never sinking to normal; or intermittent, in which type the temperature alternately rises to febrile height and falls to or below the normal. In some disorders, as pneumonia, and others similarly initiated with a chill, the rise will be rapid and sudden; in others there will be at first but

slight elevation, which gradually increases. Typhoid is of the latter class, the temperature rising about two degrees daily, but falling again each morning, so that the maximum mark is only reached on the fifth or sixth day. A febrile temperature may be expected to rise toward evening, but in rare cases the ordinary rule will be reversed, and there will be rise in the morning and remission in the evening. In some cases of typhoid and phthisis two exacerbations have been observed in the twenty-four hours, with two distinct remissions. Such deviations can only be recognized by testing the temperature frequently. It will be evident that isolated observations have not the value of a regular series. The temperature should be taken at the same hour each day to exhibit accurately the cycle of fluctuations. An irregularity in temperature, in the course of a disease which has usually a regular type, is indicative of some complication. Or it may depend upon local causes, and may be removed with them. Thus constipation will often send up the temperature, which will fall again after its relief. Bad air may have the same effect. The decline of fever, or defervescence, may, like the rise, be gradual from day to day, or sudden, dropping to a steady normal in from six to thirty-six hours.

Temperature may be artificially reduced by applications of cold, or by antipyretic medicines; it may be brought up by external heat and stimulants. The former act most effectively at the times when the temperature has a natural tendency to fall, and the latter when the tendency is to rise, as the effort of nature is then assisted rather than opposed.

Any great modification of temperature is usually recognizable to the touch, but to measure its extent with mathematical certainty the clinical thermometer

is used. This now familiar little instrument is indispensable to every nurse. Before use the index must be thrown down to a point two or three degrees below the normal. Hold it with the bulb down, and shake until the mercury falls. Do not shake it so hard as to force all the mercury into the bulb.

The temperature may be taken under the tongue, in the axilla, or groin, rectum, or vagina. The temperature of the interior of the body is more even, and somewhat more elevated, than that of the surface, so that, when it is taken in either of the natural cavities, the index will reach a point at least half a degree higher than in an artificial cavity. The mouth will be a little cooler than the cavities constantly closed, and the axillæ cooler still, and it will take longer time for the mercury to rise in these places, unless the precaution has been taken to keep the mouth or axilla previously closed for ten minutes, that they may have assumed a steady temperature. A little time may be saved by slightly warming the bulb in the hand before its introduction. Keep the patient well covered for some little time before taking an axillary temperature. The part should not have been exposed for washing or dressing for at least half an hour previously. The axilla must be first dried from perspiration, care be taken that the clothing is not in the way, and the thermometer held firmly in position. This is best done by pressing the arm closely to the side, and flexing it till the hand touches the opposite shoulder. Where great accuracy is needed, the thermometer should be left in place until the index has remained stationary for five minutes. In a very emaciated subject it may be impossible to get a correct axillary temperature.

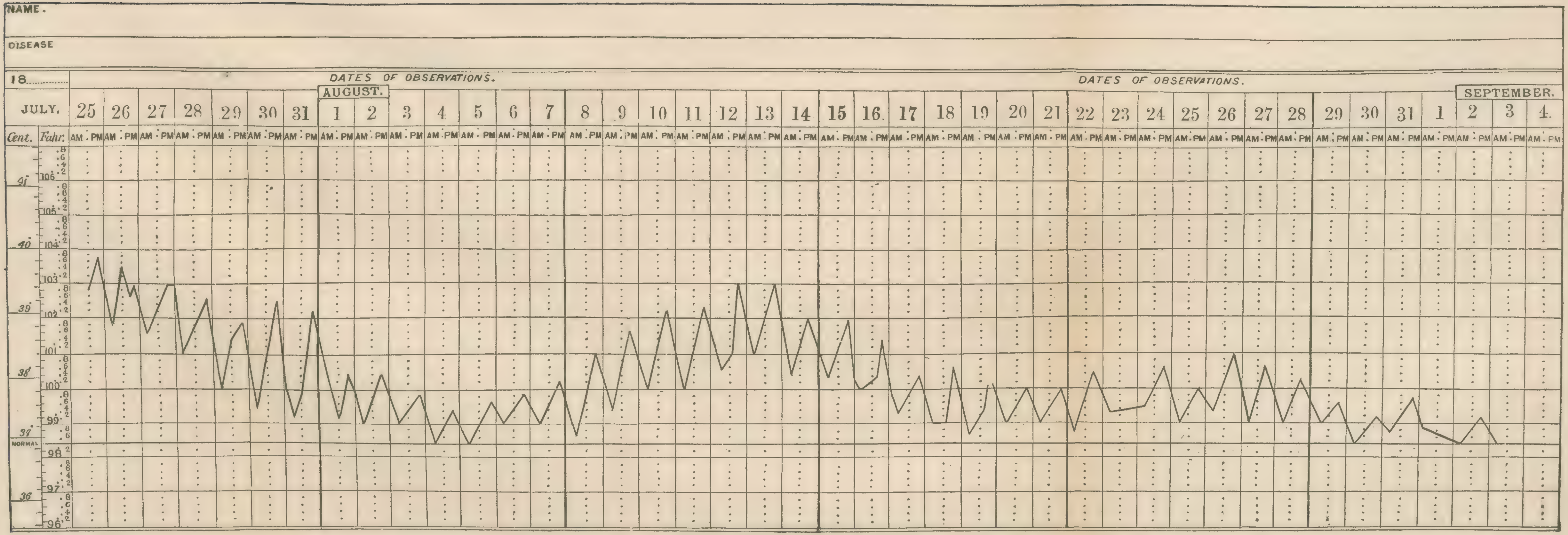
The temperature is frequently taken in the mouth,

the bulb of the thermometer being placed under the tongue. This is not always safe, as there is danger that a child, or an irresponsible patient, may bite off the bulb. The lips must be kept closed during the process. Do not take the temperature in the mouth immediately after a patient has been eating ice, nor wash the thermometer in warm water before looking at it, or you may get alarming results.

The rectum gives, perhaps, the most reliable temperature, as there are fewer possible sources of error. This method is always employed for infants. The tube should be oiled and inserted for nearly two inches. Remember that, if the rectum contains fæcal matter, the index will not reach so high a point as if the bulb comes directly in contact with the mucous membrane.

The length of time required to take a temperature depends not only upon the locality selected, but also to some extent upon the thermometer used. Some will do the work in three minutes, while others take five or ten, other things being equal. A very accurate one-minute thermometer is now made by Hicks. Every thermometer in use ought to be annually compared with some standard, as after a time it will cease to register correctly. The bulb gradually contracts a little, and too high indications result. Never leave a thermometer with a patient unwatched, unless you are very sure he is to be trusted to take care of it.

Inflammation sometimes gives a local rise of temperature, without affecting the general heat of the body. To test this, a surface thermometer is used, one with the reservoir flattened, so as to receive impressions from the open surface. The scale is the same as that of the ordinary fever thermometer, divided into degrees and fifths, but it is not self-registering. They usually come in pairs


NAME.
DISEASE
18.........
DATES OF OBSERVATIONS.
DATES OF OBSERVATIONS.
JULY. 25 26 27 28 29 30 31
AUGUST. 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31
SEPTEMBER. 1 2 3 4.
Cent. Fahr.
AM PM
41 40 39 38 37 36
106 105 104 103 102 101 100 99 98 97 96
NORMAL

matched to work together; but this arrangement has only the advantage of saving time. One will answer every practical purpose. It is to be applied alternately over the seat of inflammation, and over some corresponding part known to be isothermal with it in health. The difference shows the amount of increase in the local heat. This, like the general temperature, will be found to fluctuate, exhibiting periods of exacerbation and defervescence.

Temperatures should not only be accurately taken, but correctly recorded. Note the degree and hour immediately upon taking, without leaving time to forget. Clinical charts are made to be filled up with the records of temperature; lines drawn from point to point, as the rise and fall are noted, often give very characteristic curves. The accompanying illustration is taken from a typhoid case. The corresponding variations of the pulse may be shown on the same chart by a second set of lines drawn in red ink.

The pulse and temperature should always be considered together, not separately. The pulse is a more certain test of the patient's condition than the temperature. In peritonitis a rapid pulse with low temperature is often a grave indication. The pulse is very rapid and feeble in some patients when under ether, or immediately after an operation not necessarily severe. This needs to be distinguished from the rapid fluttering pulse after profuse hæmorrhage.

Some of the recently discovered antipyretics—notably antifebrin—may bring the temperature down in two or three hours from a high, to a subnormal point, especially in children, who are very susceptible to the influence of drugs. This is not alarming, unless the patient becomes cyanotic and the pulse feeble, but stimulants and hot bottles are indicated.

CHAPTER V.

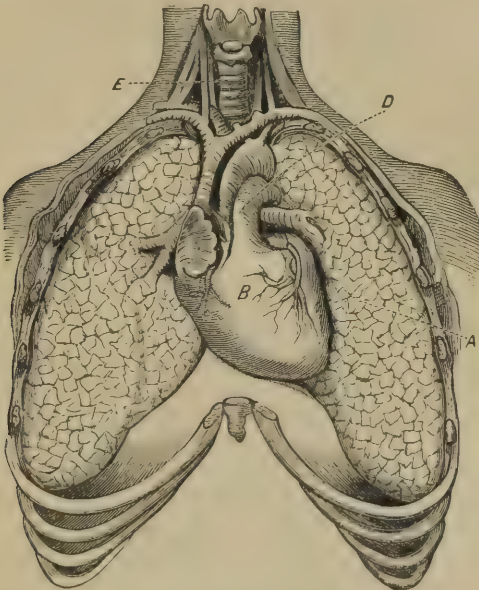
The lungs and air-passages—Respiration, its mode, object, modifications, disorders—The atmosphere, its vitiation and renovation—Ventilation, natural and artificial—Warmth—Modes of heating.

We have seen that the blood undergoes in the lungs a process of purification, rendering it fit for renewed use. To understand how this is accomplished, one must know something of the construction and working of the respiratory organs, the chief of which are the lungs, trachea, and muscles of the chest.

The lungs themselves are of a sponge-like substance, composed of air-cells lined by a network of minute blood-vessels. These blood-vessels are the subdivisions of the pulmonary veins and arteries. A series of bronchial tubes connect the air-cells with the external air, those of each lung uniting into a single bronchus, and the two finally unite with each other, to form the trachea or windpipe. Each lung is enveloped in a delicate membrane called the pleura. This is, at the root of the lung, folded back so as to form also a lining to the chest. It secretes a fluid which keeps it constantly moist, and enables the two surfaces to slide easily against each other.

The chest is separated from the abdominal cavity by a muscular partition—the diaphragm—which alternately

rises and falls, as its fibers contract and relax. The motion is involuntary, but is partially under control. As the

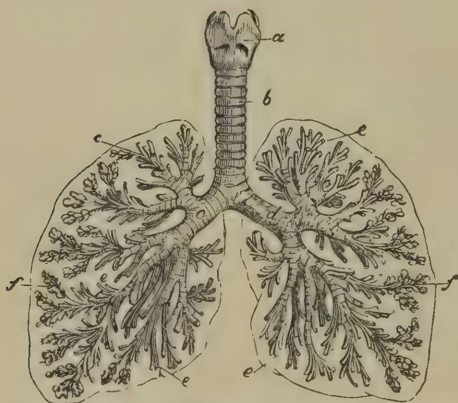


The cavity of the chest, showing the positions of the heart and the lungs: *A*, left lung; *B*, heart; *D*, pulmonary artery; *E*, trachea or wind-pipe.

capacity of the chest is increased by the descent of the diaphragm, the additional space is filled by air, sucked in through the trachea and bronchi, and expanding the elastic cells. As the diaphragm rises this extra supply of air is forced out again. The size of the thoracic cavity is still further affected by movements of the intercostal muscles, which elevate and depress the ribs. By these muscular actions, and the consequent expansion and contraction of the lungs, the alternate inspirations and expirations are produced which we call breathing

or respiration. The lungs are not completely filled and emptied by each respiration; a certain amount of air is stationary in them. The additional supply drawn in and out, sometimes called tidal air, is but a small proportion of the entire contents of the lungs; but it is diffused through and alters the character of the whole. At the end of each expiration follows a period of repose about equal to the entire period of action.

A healthy adult ordinarily breathes about eighteen times per minute, taking in each time some twenty cubic



Lungs and air-passages: *a*, larynx; *b*, trachea; *c*, *d*, bronchi; *e*, bronchial tubes; *f*, lobules.

inches of air. It takes, at this rate, sixteen respirations to completely renovate the air in the lungs. By this gradual introduction of the outer air its temperature is rendered more fit for contact with the delicate capillaries, and there is a reserve supply in case of any accidental embarrassment of respiration. It is worth noting that the habit of taking deep inspirations increases the strength and capacity of the lungs.

The direct object of respiration is the purification of the blood. Let us see just how this is effected. The air is a mechanical mixture of oxygen and nitrogen, with a small proportion of carbonic-acid gas and watery vapor. Its average composition is a little less than twenty-one volumes of oxygen to seventy-nine of nitrogen. The nitrogen in the atmosphere acts simply as a diluent. The oxygen is the universal supporter of life, the vitalizing force of all animal organisms. Carbonic acid, on the contrary, is so poisonous a gas that two or three parts of it in a thousand will produce sensibly bad effects—as headache, nausea, and drowsiness. Five per cent may be fatal.

The walls of the air-cells consist of a mere film of mucous membrane, thin enough to allow interchange of gases to take place through it, though impervious to liquids. Such transudation of fluid through a moist animal membrane is known as osmosis.

Oxygen has a stronger affinity for blood than for nitrogen; so, when it is brought near, it leaves the air inspired, to unite with the blood in the lungs. But carbonic acid and water—both of which are to be found in the blood—have greater affinity for air, and pass into it. So the air expired retains its nitrogen, and takes carbonic acid and water, but loses a part of its oxygen.

The processes of circulation and respiration are thus intimately connected, and whatever modifies the pulse affects also the breathing. There are usually four beats of the pulse to every respiration. The rate of respiration accordingly varies as does that of the pulse, being more rapid in woman than in man, in a child than in an adult, and modified by position, exertion, excitement, and other conditions; but, unlike the pulse, it is partly under control of the will. Respirations are best count-

ed, when possible, without the knowledge of the patient, as, to be natural, they must be unconscious. They are somewhat slower during sleep. One can usually see the accompanying rise and fall of the chest; but to count accurately, the hand should be laid flatly and lightly over the stomach, where the motion may be distinctly felt. Respirations below eight, or above forty, per minute, may be considered as indicative of danger. The character, as well as the frequency, is subject to variations. Breathing in man is abdominal, in woman chiefly thoracic. It may be regular or irregular, easy or labored, quiet or noisy, deep or shallow. Sometimes it presents very marked peculiarities. When each breath is accompanied by a deep snoring sound, it is said to be stertorous. Difficulty of breathing arising from any source is called dyspnœa; total absence of breath is apnœa. Dyspnœa arises when, from any cause, the quantity of air reaching the lungs is disproportionate to the amount of blood sent by the heart for purification. The blood may be in an unhealthy condition, it may be congested in the pulmonary capillaries, or it may be sent too quickly. The air may be unfit to perform its work, or it may be shut out by disease of the lungs or air-passages. If the supply of pure air be in any way entirely cut off, asphyxia results—that is, the blood fails to be oxygenated, a condition necessarily fatal if not soon relieved.

Carbonic-acid gas is heavier than air, so much so that when pure it can be poured from one vessel to another, like water. The air nearest the ground we might then expect to contain the largest proportion of this gas. It does not, however, so accumulate, owing to the diffusive power of gases, stronger even than the force of gravitation, which compels such as are in con-

tact thoroughly to intermingle. The winds and the rain hasten this diffusion, and aid in the purification of the air. Still, with the whole animal creation constantly engaged in abstracting oxygen and throwing off into the air a poisonous gas, some counteracting influence is necessary to prevent the entire atmosphere from becoming depleted, and unfit to sustain life. This is found in the vegetable world, which, under the stimulus of light, reversing the plan of the animal, absorbs carbonic-acid gas, and gives off in its place oxygen, thus securing the continual purification of the air. This circle of changes is perpetually going on, each of the great natural kingdoms deriving its own proper food from the atmosphere, and supplying in return the need of the other.

When we are out of doors the products of respiration are continually carried away by atmospheric currents, while the lungs are as constantly supplied with fresh air. But in any confined space this process is interrupted; the air is rapidly deprived of its oxygen, while noxious and irrespirable substances accumulate in its place, unless suitable arrangement is made for the constant renovation of the atmosphere. This accounts for the now familiar fact that the sick and wounded so often do better in the open air than in the best constructed hospitals.

Dr. Barnes says, in his admirable Notes on Surgical Nursing: "The most perfect form of hospital, in a sanitary view, would consist of a fine, dry table-land or very gently sloping hillside, while the ward and its fittings might consist of a hammock, a large umbrella, and a movable screen." He had in mind surgical cases particularly; but even for medical treatment his ideal outfit would have advantages, so true is it that bad air

depresses the vital powers, predisposes to disease, and aggravates such as are already established.

The air during its stay in the pulmonary cavity acquires not only a dangerous proportion of carbonic-acid gas, but also organic impurities, waste matter thrown off from the blood and from the lung substance. Thus vitiated, it is unfit to be again breathed.

The exhalations from the lungs are but one of the many causes conspiring to deteriorate the atmosphere. All the other excreta, notably that of the skin, lend their aid, and there are frequent sources of impurity external to the body. All combustion exhausts oxygen and liberates injurious gases. A single ordinary burner of illuminating gas in a room consumes more oxygen than would be required for three additional persons. Add to this the inevitable floating dust from floors and walls, from clothing, bedding and furniture, and it becomes evident that with such impurities arising continually and from numberless sources, the question of the removal of the vitiated air, and the introduction of such as is in a fit condition for use, is one of the greatest importance, even under ordinary circumstances.

Where there is sickness it becomes a still more vital consideration, owing to the presence of organic matters in increased quantity, and of most deleterious quality, and to the reduced resistive powers of the system. A thousand cubic feet of air-space, constantly renewed, are necessary for a healthy adult. A sick person should have two or three times as much, since, while the air is more quickly contaminated, renewal must be less rapid, owing to the increased susceptibility to draughts. The above-named is the minimum supply to be allowed. Too much fresh air it is impossible to get.

The substitution of pure for impure air constitutes

ventilation. There is happily a good deal of accidental ventilation through the impossibility of building a house perfectly air-tight, but it is very little in proportion to the need. Exchange of air spontaneously effected, as by doors and windows, is natural ventilation. It is mainly produced by inequalities in temperature, within and without, which set the air in motion. Artificial ventilation may be either by extraction or propulsion. A chimney with an open fire is a common type of the extraction method. The forcible introduction of fresh air by fans exemplifies that by propulsion. The former is at once the simplest and most effective. There is no better apparatus for ventilation than an open fire. The draught which it creates carries the air from the room up the chimney, while a fresh supply is drawn in to take its place. It is most important to know where this supply comes from. If there is no sufficient inlet from out of doors provided, it may be sucked in from some adjoining apartment or passage, itself so imperfectly ventilated as to afford no better air than that the place of which it takes. A strong draught through a room does not prove it well ventilated, unless one can be sure that the inward flow is from some source whence there is no danger of additional contamination. There must be direct connection with the outside air, and the higher the points of admission, the purer is it likely to be.

Two constant currents are necessary—one outward removing the impure, and one inward supplying pure air. Inlets and outlets should be of equal capacity, on opposite sides of the room, and at different heights, to secure thorough distribution. It is best to have them small and numerous, giving rise to many and moderate currents. They should be as far as possible from the

patient, and from each other. It is, of course, much more difficult to thoroughly ventilate a small room than a large one, and the liability to injurious draughts is greater.

It is impossible to keep the air of a sick-room absolutely as pure as that outside. That is, however, the ideal condition, and the one to which the nurse should aspire. In a large hospital the mutually-involved subjects of ventilation and warmth come but little under the control of the nurse. You will have only to observe and report any departure in your ward from the proper standard. In private nursing the matter comes more fully under your own management, and to keep pure the air of the sick-room is a most important part of your duty. It is one in the accomplishment of which you are likely to find many difficulties. You will have to contend with a popular prejudice against fresh air, unfortunately not altogether confined to the uneducated classes, and also with the real danger of chilling the patient. There are some cases in which open windows in the sick-room itself are inadvisable in very cold or damp weather. There is still the necessity for keeping the air fresh and wholesome, and it requires even more than usual care and watchfulness to do this. The air must be admitted from outside into some adjoining room, and then be warmed before it is allowed to reach the patient. In all ordinary cases, however, the windows may be kept open, more or less, day and night, without danger. Ventilation during the night is not less important than during the day, though the air must be more cautiously admitted, having missed the warming and purifying influence of the sunshine. It is still infinitely to be preferred to the poisoned atmosphere of a close, inhabited room, and must not be altogether

shut out. Cold is greatest, and the body least able to resist it, in the early morning, just before daylight; but it is more heat, not less air, that is called for. Instead of closing the windows, and adding the benumbing effect of carbonic-acid poisoning to that of cold, stir up the fire, and give your patient additional clothing and foot-warmers. If there must be a choice of the two evils, air too cold will in most cases do less harm than foul air. In warm weather, when open windows and doors are matters of course, there is but little difficulty in obtaining an abundant supply of fresh air. But it is a too little appreciated fact that the necessity is none the less in the coldest weather. It is a common error to confound cold air with clean air, and to suppose that ventilation can be measured by a thermometer. Changes in the quality of the air are not so sensibly felt as changes in its temperature; the more care is needed to guard against them. No thermometer registers its deterioration; the only test ordinarily practicable is by the sense of smell. A "sick-room odor," perceptible upon entering from the fresh air, is incontrovertible evidence of poor ventilation. It is obviously desirable that a nurse should have a good nose; but after a short time spent in a vitiated atmosphere, its sensitiveness will be lost, and not at once regained even out of doors, so that it ceases to be a reliable guide. One can not be too watchful, for there are few more mortifying occurrences for a nurse than to have the doctor come in from outside, and remark, "Your room is close."

Even in the coldest weather, windows may be frequently thrown wide open for a few moments at a time, the patient being meanwhile protected by additional covering. A large umbrella opened, with a shawl or blanket thrown over both it and the patient, has been

recommended as affording an effectual screen. If the patient is able to move about, advantage should be taken of every occasion when he leaves the room, to ventilate more thoroughly than can be done in his presence. But do not depend entirely upon such occasional opportunities. The contamination of the air is continuous; its purification should be equally so. There are numerous simple devices for opening windows and at the same time protecting the patient from direct draughts. The lower sash may be raised, or the upper one lowered, and the entire opening closed by a board an inch thick. The current of air then enters only in the middle, between the two sashes, and is given an upward direction. Or, placing the board on the window-sill, a little inside of and extending somewhat higher than the opening, similarly directs the current, and gives two apertures for the admission of air. A wire screen serves a useful purpose by minutely subdividing the current of air before allowing it to enter. Much better for purposes of ventilation than the ordinary sliding-windows are those hinged at the lower edge and opening inward at any desired angle. A deep window-frame prevents side draughts. Currents of cold air should be always first directed upward.

As has been suggested, the best method of securing an outward flow of the foul air is by an open fire. In a large room it may be insufficient for heating; but other appliances ought to be supplementary to, not substitutes for this. If it is too warm for a fire to be desirable, a lamp burning on the hearth is good to create a draught. Extraction flues must in some way be heated, or they will not draw. To allow open windows, there must be a surplus of heat. Economical housekeepers will sometimes object to "heating all outdoors," but it is an economy in the wrong direction. Stoves assist ventila-

tion in the same way as grate-fires, though not to the same extent, by drawing off the foul air. A pan of water should be kept on the stove, to dampen the air by its evaporation. Heat without moisture is injurious, a certain amount of watery vapor being essential to the wholesomeness of the air. Furnace-heat is especially dry; radiators are still worse, and give no aid to ventilation.

Patients with pulmonary disease often find, to their surprise, that they breathe with less difficulty in damp and foggy weather than on a clear, dry day. Such may derive considerable relief from a kettle of water kept boiling vigorously in the room. A large sponge, or towel, hung in front of a hot-air register, and kept wet, will also sensibly dampen the atmosphere. In all disorders of the respiratory system, if no special directions are given by the physician, keep the room at a temperature of from 70° to 75° Fahr.; in purely febrile disease, 65° is more suitable; for other cases, 68° is a good point. Whatever temperature is decided to be best should be steadily maintained.

It is to be remembered that there is especial necesity for warmth in children, in the very aged, and in cases of diarrhœa. It is of far greater importance to keep the sick-room warm when the patient is out of bed than when he is in it. People rarely take cold under the bedclothes. Convince your patient of this, if possible, and, observing all precautions against the possibility, do not allow any prejudice, either on his part or that of his anxious but ill-instructed friends, to prevent you from giving him an ample supply of fresh, pure air. Remember that the lungs can not, in any confined space, fulfill their office of purifying the blood and removing its waste particles unless provision is made for

the constant renovation of the air. This can hardly be too much emphasized. There are three important rules in regard to ventilation, viz.: sufficient pure air must be introduced; the foul air must be removed; these ends must be achieved without injurious draughts.

CHAPTER VI.

Observing and reporting symptoms—General physiognomy, attitude, and expression—The vital signs and allied symptoms—The skin—The eye and ear—The digestive tract, etc.—Nervous phenomena — Sleep – Associated symptoms — Bedside notes.

A GREAT point of distinction between the trained and the untrained nurse is, or should be, the ability of the former to observe accurately, and to describe intelligibly, what comes under her notice. The nurse who is with her patient constantly, has, if she knows how to make use of it, a much better opportunity of becoming acquainted with his real condition than the physician, who only spends half an hour with him occasionally. The very excitement of his visit will often temporarily change the entire aspect of the patient, and make him appear better or worse than he really is. In order to form correct judgments it is necessary for the physician to know what goes on in his absence, as well as in his presence, and for such information he is forced to rely almost wholly upon the nurse. It is thus of the greatest importance that she cultivate the habit of critical observation and simple, direct, truthful statement. Even where there is no intent to deceive, very few people are capable of making a report of anything which shall be neither deficient, exaggerated, nor perverted.

The doctor wants facts, not opinions; and a nurse who can tell him exactly what has happened, without obscuring it in a cloud of vague generalities, hasty inferences, or second-hand information, will be recognized as an invaluable assistant.

The phenomena which accompany disease are termed symptoms. Symptoms may be classified as subjective, those which are evident only to the patient; objective, which may be appreciated by outside observers; and simulated, feigned for purposes of deceit, either to excite sympathy, or from other motives. It requires both experience and judgemnt to enable one to distinguish between real and feigned symptoms. An expert malingerer will now and then deceive an entire hospital staff into the treatment of a malady that has no real existence; while, on the other hand, genuine suffering may chance to be mistaken for fraud, or hysteria, if the usual objective manifestations are absent. The difficulty of determining the false from the true is often very great, especially where, as is frequently the case, there is an undoubted basis of fact. Entirely subjective symptoms may always be regarded with some degree of suspicion, as disease unaccompanied by any outward sign is comparatively rare. It is better to be duped once in a while than to fail to give aid or sympathy where it is really needed; but, without letting the patient feel that he is being watched, let nothing pass unseen, note the most fleeting signs, and, if you have any quickness of perception, you will soon get an impression of his mental attitude as well as his physical state, and can judge to some extent whether his statements are to be relied upon, and whether he has a tendency to exaggerate his ills, or to make light of them.

To decide as to the existence of disease, of course belongs solely to the doctor, but he will be largely guided by the observations of the attentive nurse, and she herself will often be called upon to judge as to the urgency of special indications. Shall she send for the doctor in the middle of the night, or apply her own resources? shall she give or withhold the medicine left to be used only in emergency? shall she alter or let alone an arrangement which has proved unexpectedly uncomfortable? are questions constantly arising. The nurse needs to be able to discriminate between the important symptoms, and those which are merely incidental—to recognize those which call for immediate action, and to know what kind of action on her part is called for.

When you have acquired the habit of observation so necessary for you, you will, at the first glance at a new patient, get an idea of his general physiognomy and any prominent peculiarities; closer investigation will reveal more minute particulars.

Try to learn all you can of the previous history of the case; you will sometimes get valuable points which the patient would hesitate, or not think of sufficient consequence, to mention to the doctor in person.

Note the patient's apparent age, with any indications of premature or disguised age, signs of weakness, size, whether well or ill nourished, emaciated, corpulent, or bloated, and any deformities, swellings, or wounds.

Attitude and expression are sometimes very characteristic, giving valuable indications. A sufferer instinctively takes the position most calculated for ease. Thus, when one lung is affected, the patient lies on that side, so that the healthy one, which has to do most of the work, may have the greatest freedom of motion. Lying on the back, with the knees drawn up so as to relax the abdomi-

nal muscles, suggests peritonitis. With colic, on the contrary, you may find the patient lying on the abdomen, as pressure relieves pain of such character. When a patient who has lain persistently on his back turns over to the side, it may be looked upon as a sign of improvement. There is no surer indication that the distress of dyspnœa is removed than for a patient, who has been forced to sit up, to lie down and compose for sleep. The inability to breathe while lying down is termed orthopnœa. It occurs in affections both of the lungs and of the heart. Lying quietly is usually a favorable sign; but in acute rheumatism the patient is quiet because the least motion causes pain. Again, extreme weakness may render it too great an exertion to move. Restlessness is ominous in most organic diseases. Slipping to the foot of the bed is sometimes a very bad sign.

A pinched and anxious look is often the forerunner of serious mischief, while a tranquil expression is usually of favorable import. Sudden lack of expression, apathy, or immobility of features is a bad symptom, excluding cases of hysteria and mental weakness. In facial paralysis, expression will be totally absent from half the face, or it will be drawn and distorted—the healthy side being the one thus affected.

Some painful abdominal affections are accompanied by a sort of sardonic smile—*risus sardonicus*—from contraction of the muscles of the mouth. Any such contortion of feature is noteworthy, as also extreme thinness or swelling of the lips, and excessive action of the nares. The facial expression in sepsis is very marked and characteristic, although difficult to describe.

The most important indices of disease are the pulse, respiration, and temperature, sometimes called the three

vital signs. They have already been discussed under their several heads. The three are intimately associated, and correspondingly affected. The frequency, rhythm, and force of the pulse are to be carefully observed, and its relations to other symptoms. Note the rate and any peculiarities of respiration, whether it is most abdominal or thoracic, if regular or irregular, easy or labored, and whether or not accompanied by pain. There is no pain in disease of lung-substance alone; when the pleura is involved, there is sharp pain. In bronchitis or asthma there is difficulty in breathing, an evident muscular effort; in pneumonia it is rapid, and more shallow than in the former. Dyspnœa is common from various causes. There is one very peculiar form of it, known as the Cheyne-Stokes respiration, in which the inspirations, at first short and shallow, become by degrees deep and difficult up to a certain point, and then again more and more superficial until they entirely cease. After a pause of from a quarter to half a minute, the same series of phenomena are repeated in the same order. This is a curious and generally a fatal symptom.

Cautious respiration indicates lung trouble of some kind. Œdema of the lungs, or the presence of fluid in the air-passages, is evidenced by rattling and shortness of breath. The sounds produced by the passage of air through the fluid in the air-cells, bronchi, or cavities are known as râles.

Most disorders of the respiratory organs are accompanied by cough. This is caused by irritation of the air-passages, and is often an effort at the expulsion of a foreign body. Matters coughed up are called sputa. Cough not accompanied by expectoration is said to be dry. The character of the expectoration varies with different diseases. In bronchitis it is at first simply

mucous, later it may become purulent; in chronic cases it is thick and yellow. The sputa of phthisis are at first tenacious and ropy, sometimes frothy, at an advanced stage becoming purulent and streaked with blood; sometimes peculiar cheesy lumps are expectorated. In pneumonia the expectoration is for the most part scanty; after a certain stage it has a characteristic rust color, and a tenacious, tough quality. Gangrene of the lung gives dark, greenish sputa, very copious and offensive. Cancer of the lung has a peculiar gelatinous form of expectoration. In children, the sputa are often swallowed; if thrown up mixed with food, they may be known to come from the stomach.

Note whether mucus accumulates during the night, and the time of day when the cough is the worst; if it is increased by moving, or on first waking; the character of the cough, whether hard or loose, choking, short, incessant, or paroxysmal. Note frequency, duration, and intensity of paroxysms, and if followed by exhaustion or perspiration. The brazen ring of whooping-cough is well known and unmistakable. In laryngismus stridulus, "false croup," a spasmodic affection of the glottis, there is a peculiar crowing sound. Hoarseness, or aphonia, failure of voice, may arise from disorder of the respiratory tract. Singultus or hiccough, a spasmodic contraction of the diaphragm, ordinarily of small account, is an important and unfavorable symptom toward the close of an acute disease; a peculiarly obstinate form is occasionally seen in hysteria. Yawning, sighing, and sneezing, are sometimes noteworthy as sympathetic phenomena.

If a patient complains of cold without apparent reason, take his temperature. A sense of coldness along the spine is often the precursor of a chill, and the tem-

perature will be found elevated rather than lowered. Chills, or rigors, are nervous phenomena; although the patient is shivering, the temperature rises, because the capillaries are so much contracted that the blood can not get to the surface to be cooled. High fever always follows a genuine chill. Chills may usher in acute disease; if they occur in the course of inflammation, they probably indicate suppuration; in malarial affections they are severe and prolonged, but not dangerous. The temperature should be taken both during and soon after a chill—the time of occurrence, duration, number, and degree of severity should all be carefully noted.

With a fall of febrile temperature there is apt to be profuse perspiration. Extreme weakness, and other causes, often produce the same result. The degree of moisture or dryness of the skin is always an important point. A high temperature with a wet skin is much more alarming than the same temperature with a dry skin. Note in what part of the body moisture appears, at what time, in connection with what other symptoms, whether it is cold or warm, and if there is any peculiar odor about it.

The skin affords other conspicuous signs as well. Variations from a healthy color will at once attract attention. The yellow tinge of jaundice is well known, indicating disordered action of the liver. A bronze hue is present in Addison's disease and in some cases of septicæmia. With anæmia there is a peculiar paleness; in Bright's disease a waxy complexion. Chronic opium-eaters may often be recognized by their sallow skin, taken in connection with other appearances.

A red color shows excess or suffusion of blood, and a cyanosed or bluish shade, imperfect purification. In pulmonary disease there is often high color of one cheek

alone. Sudden change of color may give warning of syncope. Extreme pallor accompanies internal hæmorrhage. Paleness about the mouth, with compressed or slightly parted lips, indicates nausea. Patches of color, flushing, dark circles under the eyes, have each their significance. Any eruption or rash must be especially noticed and promptly reported, its character, location, extent, time of appearance, and associated symptoms. Of less consequence, but still to be taken into account, are scars, parasites, the cleanliness of the body, any roughness of the skin, etc. Scaling off of the cuticle is called desquamation. This takes place generally in the course of measles, scarlet fever, and some other diseases. Attention will probably be called to any local irritation, or unnatural sensation, as burning, tingling, itching, numbness, or crawling. Early signs of bed-sores can not be too carefully watched for. The condition of wounds must receive attention; blushing or puffiness of the surrounding parts, sudden stoppage or alteration in the quality of the discharge, should be reported at once.

The eye, besides its own local affections, may give signs of general disorder. It may appear unduly prominent or sunken, there may be altered color or inflammation of the conjunctiva, disturbances or loss of vision. Observe the size of the pupils, if one or both are contracted or dilated. Squinting, if habitual, is of no importance; but if it comes on in the course of brain disease, it is an unfavorable symptom. Note any swelling of the eyelids, drooping or tremulous movement of them, fear of light, apparent weakness, and over-secretion of tears.

The sense of hearing may be preternaturally acute, or, more commonly and less significantly, defective. The

former condition sometimes precedes delirium. Subjective disturbances of hearing may arise from congestion of the cerebral blood-vessels. Some drugs, notably quinine, produce this effect. Any discharge from the ear should be noted as to its character and amount.

Taste, like the other special senses, may be impaired or vitiated. With a disordered liver there is often a bitter taste; in phthisis, one of salt; and under some medicinal treatment (mercury, arsenic) a decided metallic flavor. The sense may be entirely destroyed for the time; it is rarely over-acute.

The tongue offers many valuable indications, for it sympathizes not only with the digestive organs, but to some extent with the whole system. Note if it is dry or moist, clean or coated, swollen, bitten, or indented by the teeth. In fever the tongue is likely to be furred; but this is not always a sign of disease, for some people in good health have a furred tongue constantly, or it is induced by slight constipation. The fur may be white, yellow, or any shade of brown to nearly black. When the fur begins to grow thin, and clean up from the edges of a fevered tongue, it is a better indication of convalescence than when it clears in patches, or rapidly, leaving a raw or glossy surface. In scarlet fever there is often a characteristic appearance known as the "strawberry-tongue," a bright red with the swollen papillæ showing prominently through the fur. So the swollen and livid tongue of typhus is sometimes described as a "mulberry-tongue."

Take the opportunity, in looking at the tongue, to notice also the odor of the breath and the state of the teeth and gums. Looseness of the teeth, and sore gums, are to be watched for while giving mercurials. Salivation, or ptyalism, an over-abundant secretion of saliva, is

occasioned by some other drugs as well as mercury, and sometimes occurs spontaneously. At the commencement of acute disease this secretion is more likely to be diminished in quantity, and thickened. With high fever, the teeth, if not well cared for, may become covered with an accumulation of dark-brown matter known as sordes. A dark line appearing along the edges of the gums is a thing to call attention to; it is an evidence of lead-poisoning. Aphthæ (thrush) are to be looked out for in infants, and sometimes occur also in adults in an advanced stage of disease. White patches in the throat are always ominous. Learn to distinguish the discrete white spots of quinsy from the diffuse grayish membrane of diphtheria. Slight sore throat not infrequently accompanies indigestion, or a cold.

The state of the appetite is an important point. Nearly all acute diseases occasion loss of appetite. An increased appetite, bulimia, is more rare, but may exist even with an inability to retain food. The appetite may be vitiated, the patient desiring improper food; but, as a rule, a longing for particular things shows a need of them which ought to be gratified. Observe with special care how much food the patient takes, what kinds of food are most acceptable, and, as far as you can, the effects of each.

Thirst may remain when the appetite is completely lost. It almost always exists in acute, seldom in chronic, disease. A very common symptom is nausea. It is usually relieved by vomiting. Note if it is persistent, if vomiting is accompanied by straining or pain, the interval since taking food or medicine, the amount and character of the vomited matter. This will be generally undigested food; it may contain bile, blood, or even fæcal matter. The presence of the latter constitutes

stercoraceous vomiting, and is a very important symptom, as it indicates intestinal obstruction, and may call for immediate operation. An appearance like that of coffee-grounds is sometimes caused by the admixture of a small quantity of blood. The "black-vomit" of yellow fever has something of this character. When blood is present to any extent in vomited matter, it is usually found also in the stools, giving them a dark color and tarry consistency. Some drugs, as iron and bismuth, also blacken the stools. With jaundice, they will be very light, clay-colored. It is important to note the frequency and quantity of the evacuations, if solid or liquid, any unnatural odor or appearance, the presence of mucus, pus, blood, or worms. If there is any doubt about the character of stools or vomited matter, they should be saved for the doctor's inspection. Tenesmus —a constant desire to empty the bowel, with pain and inability to do so—is a distinguishing symptom of dysentery. Constipation is very common, and is often produced by over-use of cathartics or clysters. Diarrhœa may exist even with impacted fæces, the patient having frequent small movements without unloading the bowels. What is passed under such circumstances will be either fluid, or small, dark, hard masses, known as scybala. This is important to remember, for a nurse is too apt to have the idea that the patient's bowels must be all right if they move daily, without regard to the quantity passed. Where a stricture exists, the evacuations will be very small in caliber. Eructations of gas, rumblings in the intestines, and tympanites (distention of the abdomen by gas), are all noteworthy, as also dysuria (painful passage of urine), and suppression, retention, or incontinence. The latter is no evidence that the bladder is empty. There are many important indica-

tions to be derived from the urine which will be spoken of later.

In women the menstrual function calls for special observation; the regularity in the appearance of the catamenia, whether accompanied, preceded, or followed by pain, and any related phenomena.

Hæmorrhage from any organ is always more or less important. Even a nose-bleed may be an initial symptom of typhoid. The color, quantity, and general character of any discharge are to be carefully observed.

Pain is always a subjective symptom, though most often accompanied by others which are objective. Pain implies life and reaction, and its absence is not always a favorable indication. With an extreme degree of shock there is no pain. Sudden cessation of pain during the progress of severe organic disease generally heralds the approach of death. Pain may be inflammatory or neuralgic; the former is increased by pressure, the latter relieved by it. Get the patient to describe the kind of pain that he feels, as well as to locate it; to tell whether it is acute, dull, aching, stinging, burning, steady, spasmodic, etc. Exaggerated sensibility is called hyperæsthesia; diminished or lost sensibility, anæsthesia. Either may be general or local. Partial anæsthesia is often conjoined with loss of muscular power—paralysis. If the lower half of the body is so affected, it is called paraplegia; paralysis of the lateral half is hemiplegia. In hemiplegia the temperature may be found a degree, or a degree and a half, higher on the paralyzed side than on the other. Aphasia, loss of the power of speech, occurs most often in connection with right hemiplegia.

Incoherence of speech, muttering, slowness of comprehension, loss of interest, unusual irritability of temper, difficulty of swallowing, a tendency to spill food or

drop things, and picking at the bedclothes, are all symptoms of gravity. Involuntary muscular contractions vary from slight spasms, as cramps, to severe convulsions. Subsultus (twitching of the muscles), and many little nervous motions may be so classed. Note the frequency and persistency of movement, whether the convulsions are general, or are confined to one part of the body, whether or not the patient is unconscious, and if the attack is sudden, and the mental state before and after it.

Under disorders of consciousness are included all sorts of delusions and hallucinations, delirium, and stupor. Note the kind of delirium, if quiet, busy, or maniacal; if persistent, or only occasional, and when it is most violent. Try if the patient can be roused from stupor. Complete insensibility, from which the patient can not be awakened, is known as coma. Profound coma, which does not terminate within twenty-four hours, may be regarded as almost certainly fatal. Continuous sleeplessness, with partial unconsciousness, constitutes coma-vigil, also an almost invariably fatal symptom. Insomnia is always ominous in proportion to its duration. It is important to note how much sleep a patient gets, at what time, whether it is quiet or disturbed, the occurrence of dreams, talking in sleep, etc. A patient will often think he has been awake all night, when, in fact, he has had several hours of sleep without realizing it. The nurse should be able to state the facts accurately.

The degree of intensity of all symptoms, the time and order of appearance, and the combinations, are to be observed. Often a symptom, which by itself would be insignificant, becomes in its relations with others of grave import. If uncertain whether a circumstance is of any value or not, still make note of it, for it is better

to report to the physician a dozen superfluous items than to omit one of importance. Do not trust too much to memory, but keep a little memorandum book in which to note facts and take down orders. A sheet of foolscap ruled, after the following plan, gives a good form for bedside notes.

Bedside Notes.

Date, ________ Day of Disease, ________

Name ________

Physician, ________

Time.	Pulse.	Respiration.	Temperature.	Medicine.	Nourishment.	Sleep.	Urine.	Defecation.	Remarks.

Summary:

Nurse, ________

CHAPTER VII.

Modes of administering medicines—Medication through the skin—Hypodermic injections—Inhalations—Medication by the stomach—Preparations of drugs—Care of medicines—The nurse's responsibility—Peculiar actions of drugs—How to disguise disagreeable tastes—Doses for children—To give medicine by force—Measurements—Abbreviations—List of drugs in common use.

MEDICINES may be introduced into the system through the skin, the mucous membrane, or the subcutaneous tissue, with the same constitutional results, but differing in degree, and in the time required to produce them.

There are three ways of introducing medicine through the skin, known respectively as the enepidermic, the epidermic, and the endermic methods. In the first, the medicinal agent is simply placed in contact with the skin, to be absorbed, so far as may be, by it. If friction is employed to hasten absorption, the method becomes epidermic. In the endermic method the cuticle is removed by blistering, and the medicament sprinkled over the raw surface; absorption is then much more rapid. This is now but rarely practiced, as, although sometimes effective, it is painful and somewhat uncertain.

Endermic medication has been largely superseded by hypodermic or subcutaneous injections. These the nurse will frequently have to give, and she must be

thoroughly familiar with the process. There are several precautions to be observed. A new syringe should be compared with a standard minim-glass, as the measurements vary considerably, and accuracy is highly important. See that it is in good working order, does not leak, and that the needle is sharp and unobstructed. Having carefully measured the amount to be administered, hold the instrument with the needle upward, and force out any bubbles of air that may remain in it. Then pinch up a loose fold of flesh between the thumb and finger, and insert the needle quickly to the extent of an inch deeply down among the muscles. Withdraw it slightly, then inject slowly the contents of the syringe. After removing the needle, keep a finger on the point of insertion for a moment, to prevent the escape of the fluid. Gentle rubbing will hasten its absorption. Clean and wipe both needle and syringe after using, and replace the wire in the needle at once. The best way to clean the inside is to pump a little alcohol through it. This also will prevent the needle from rusting. Hypodermic injections are given to relieve pain, or induce sleep, and when speedy action of a drug is important. Remedies introduced in this way act more powerfully and more rapidly than in any other, and the operation, if skillfully performed, is but slightly painful. By using a clean, aseptic needle and giving the injection deep in the muscle,. the most irritating fluids (ether, brandy, camphorated oil, etc.) can be injected with impunity. Such injections are frequently necessary in collapse after operations. The liability to the formation of abscess is said to be least where morphine is used. Abscesses are in most cases due either to carelessness in injecting, to the use of a syringe not thoroughly clean, or to an impure solution, but occasionally are unavoidable, resulting

from a lowered condition of the system, which predisposes to inflammation upon slight irritation. A dilute is less irritating than a concentrated solution. In some cases painful spots will remain for several days. These may be relieved by bathing with alcohol, or by the application of an ice-bag. Give the hypodermic injection in the arm or leg, never in the neck or stomach, though you may occasionally see a physician do it. In treating a lady, it is better to avoid the arm, on account of the possibility of a resulting abscess, which might leave an unsightly scar. The outer side of the thigh is perhaps the best place. The distance from the seat of pain makes no difference, as the effect is systemic, not local. Bony prominences and inflamed parts are to be avoided, and caution observed against puncturing a vein. Death has resulted from the introduction of a solution of morphia directly into a vein. Intravenous injection is occasionally practiced, but only by the physician, and its consideration, except as a thing to be avoided, does not enter into the province of a nurse. Medicines to be given subcutaneously must be perfectly dissolved, and free from the slightest impurity. Solutions too long kept develop a fungoid growth, which renders them unfit for hypodermic use. Decomposition may be prevented by adding ac. salicyl., gr. $\frac{1}{4}$, to an ounce of solution. It is much better to prepare them only as needed. To the solution of morphine, a little atropine should always be added (gr. 1–120 to morph. gr. 1–6), to prevent nausea and lessen the danger of poisoning.

In hysterical patients, as well as in those accustomed to the use of morphine in minor ailments, a hypodermic injection of water often has quite as satisfactory an effect.

Some general effects, as well as those locally upon the

throat and lungs, may be obtained by inhalation. In this way anæsthesia is induced by chloroform or ether. Volatile substances to be inhaled may be simply evaporated from a piece of cloth or cotton held near the nostrils. Others can be finely subdivided by a hand or steam atomizer throwing the spray into the mouth. The patient should be directed to breathe quietly, without extra effort A simple and convenient device for the inhalation of steam, or medicinal vapor, is a pitcher of hot water, having closely fitted over it a cone of thick paper, with an aperture at the top through which the patient may breathe. He should inhale by the mouth, and exhale through the nose. The temperature of the vapor should not exceed 150° Fahrenheit. It is made medicinal by the addition to the hot water of prescribed drugs.

The most common mode of introducing medicines into the system is through the mucous membrane, generally that of the stomach. Applications to other parts of it are more frequently for local effect, and will be spoken of elsewhere.

Medicines are taken into the stomach in various forms of pills, powders, and solutions. Some patients find an almost insuperable difficulty in taking pills. The smaller the pill, the harder it is to swallow, and if its size is increased by enveloping it in bread or jelly, the trouble will often be overcome. Place it as far back in the throat as possible, and follow immediately with a large swallow of water. Pills that have been long kept become very hard, and, if taken in that condition, may pass through the intestinal canal undissolved, and so without effect. If nothing better can be procured, they should be pounded up, and given like powders, in water, milk, or sirup. A small powder may be concealed be-

tween two layers of jam or marmalade, and swallowed without difficulty. Powders insoluble in water, as calomel or bismuth, may be placed dry on the tongue, and a drink taken to wash them down. Those of objectionable flavor are frequently inclosed in wafers of rice-paper or dough, or in capsules of gelatin, either of which will dissolve and liberate its contents in the stomach.

Nearly all medicines are now put up in tablet triturates, a neat, convenient, and compact form. The drug, having been triturated with sugar of milk, is made into a soluble paste with alcohol and water in varying proportions, and then molded into uniform tablets. These provide exact dosage, and can be kept indefinitely. Similar tablets are also made for hypodermic use, and for antiseptic solutions.

A mixture is a suspension in some vehicle of an insoluble substance.

An emulsion is a mixture of oil and water, made by rubbing up with gum.

A decoction is a solution of a vegetable substance made by boiling. Decoctions, as a rule, do not keep well, and should be freshly made at least once in forty-eight hours. To an ounce of the crude drug, add fifteen ounces of water, and boil down to ten ounces.

An infusion is a similar preparation made with hot or cold water, without boiling. One ounce of the drug to ten of water is now the rule.

Spirits are alcoholic solutions of volatile substances.

Tinctures are alcoholic solutions of non-volatile substances.

Fluid extracts are like tinctures, but stronger.

A saturated solution of any substance is one that contains all that can be dissolved in it.

All bottles should be distinctly labeled, and one should never omit to carefully read the label before measuring the dose, and again afterward. Attention to this rule would have prevented many serious mistakes. In pouring, keep the label on the upper side, to avoid defacing it. Remedies for external use are now often put up in fluted bottles of colored glass, recognizable to touch as well as sight. For the same purpose, it is recommended to tie a bow of ribbon around the necks of the bottles containing them. No medicine should ever be given in the dark. Always shake before opening the bottle ; it is often important, and always harmless. Do not leave the bottle uncorked longer than necessary, for volatile substances escape, and others grow more concentrated by evaporation.

Medicines should be kept in a dry, cool, and dark closet. Dampness impairs the activity of most drugs, and many are decomposed by light or heat. Only a few should be kept on hand, each in small quantity—as they do not, as a rule, keep well—and of the best quality. It is poor economy to buy drugs where they are the cheapest, as they are almost sure to be adulterated. Get them from a reliable apothecary. What is left of a prescription the use of which is permanently discontinued should be thrown away, as it is highly improbable that the same combination will ever be called for again, and most of them undergo changes in character by age, so that to keep them only increases the contents of the medicine-chest, and increases the liability to error. Liniments, and all preparations for external use, should be kept in a corner by themselves, and labeled *Poison*. Medicines ought to be kept under lock and key. Especially is it important in a hospital ward not to leave dangerous drugs within reach of the patients. The

ward medicine-chest should be systematically arranged, each bottle or box in its own place, so that there need be no delay in finding things called for.

The nurse's responsibility in the matter of medicines consists in the prompt, accurate, and intelligent administration of such as are prescribed by the physician. Only in cases of unusual emergency, and where medical advice is unattainable, should you ever assume anything beyond this. You will be constantly asked by people who consider a nurse as "next thing to a doctor," and who do not realize that here is the most rigid line of demarkation between them, to recommend something for this or that trouble. Do not permit yourself to yield to the temptation to tell what you have seen used in similar cases, for you can not be sure that the cases were exactly similar. Remember that a well-disciplined nurse never makes a diagnosis, and never prescribes. But you should know the effects that the remedies which you give are intended to produce, and when their continuation is contra-indicated. It is well to familiarize yourself with the ordinary doses of medicines in common use, and with the symptoms of overdosing.

The susceptibility to the action of drugs varies in different individuals, and is much modified by habit. This is especially true of narcotics. Custom produces tolerance and diminished impressibility, so that after a time increased quantities are required to produce the same effect. There is great danger of becoming dependent upon their use. The habit—pre-eminently that of opium—is so easily acquired, so difficult to overcome, and is followed by such a train of disastrous consequences, that the greatest care should be taken to avoid it. Narcotics ought *never* to be used except under the direction of a physician. After giving a narcotic,

the patient should be kept undisturbed until it takes effect.

If a medicine ordered in gradually increasing doses is for a time discontinued, the acquired tolerance may be lost, and, upon recommencing, there must be a return to the smallest dose, or too powerful effects may follow.

Some drugs, notably digitalis, have, on the contrary, a cumulative action, seeming at first inert, but after a few doses acting suddenly and with great energy, having apparently the effect of the several doses combined. Such are given in gradually decreasing, rather than increasing, doses.

The exact results of a given dose can not always be foreseen. It occasionally happens that individual idiosyncrasies interfere with the action of medicinal agents, and even render injurious those usually salutary. Thus opium sometimes excites instead of quieting, and the smallest quantity of mercury will salivate a susceptible constitution. Strong solutions of the bichloride should never be injected into any of the mucous tracts. Every unusual or inordinate action of a drug should be reported to the physician, and its use suspended until further directions are received.

Peculiar effects sometimes depend upon the imagination, for which reason it is better that the patient should not always know what he is taking. His medicine should be brought to him at the proper time, ready to take, without thought on his part, or previous discussion. Regularity and promptness in its administration are important. Do not fancy that half an hour more or less will make no difference, nor harbor the absurd notion that if by an accident the dose should be omitted at one hour the error can be rectified by doubling it the next time.

If there are no special orders given, allow an interval of half an hour between medicine and food. Most drugs act more powerfully on an empty stomach, and some are too irritating to be borne. Arsenic, iron, and cod-liver oil are always given after eating. If medicines are ordered just before meals, care must be taken that the diet is not such as to be incompatible. Milk taken too near a dose of quinine in solution, or any acid, may be coagulated and rejected. The activity of iodine will be impaired by starchy food.

The spoon or glass in which medicine is given should be washed each time immediately after use. Iron and the mineral acids should be taken through a glass tube, to prevent injury to the teeth, or the teeth should immediately after be thoroughly brushed with a soda or borax solution, or with white Castile soap. A separate glass should be kept for oily and strong-smelling medicines. Disagreeable tastes may be to some extent lessened by holding the nose while swallowing. A bit of bread is better than anything else to remove lingering traces of the flavor. Licorice and dried orange-peel, or a piece of preserved ginger, are recommended, but better than anything to take after medicine is some pungent flavor beforehand, as a little brandy, essence of peppermint, or wintergreen, which will blunt the sensibility of the nerves of taste. Oil may be given in brandy, strong coffee, lemon-juice, or in the froth of beer. Pour the dose carefully in the center, so that it will nowhere touch the glass, and it can be easily swallowed. For a child, shake it in a bottle with hot milk, sweeten, and flavor with cinnamon, or stir it into a cup of hot broth. Nearly tasteless emulsions can be procured of both castor and cod-liver oil.

Children are peculiarly sensitive to the action of

drugs, and usually call for but small quantities. A rule given for the administration of medicine to a child under twelve years is: Add 12 to the child's age and divide the age by the sum. For instance, if the child is two years old, the formula is $\frac{2}{2+12}=\frac{2}{14}$ or $\frac{1}{7}$. Give $\frac{1}{7}$ of the adult dose. If the child is six, $\frac{6}{6+12}=\frac{6}{18}$ or $\frac{1}{3}$. Give $\frac{1}{3}$ of the adult dose. There are some exceptions to this rule, as calomel and castor-oil, which need only be reduced about one half for a child.

It sometimes become necessary, in the case of a child or a delirious person, to administer medicine by force. To do this, compress the nostrils so that the mouth will have to be opened in breathing. The medicine can then be carried in a spoon far back in the mouth and poured slowly down the throat, when it must of necessity be swallowed. Force should only be resorted to when all other means fail, as the excitement which it occasions is always injurious. Persuasion accomplishes much with children, and even an apparently insensible patient may often be induced to swallow if you first attract his attention by gently rubbing his lips with the spoon.

Medicines should be measured in a graduated glass, or doses of less than a drachm in a minim-tube, both of which can be procured at any drug-store. Spoons are of very variable capacity, and drops differ with the consistence of the fluid and the shape of the edge over which they are poured, so that they can be with the greatest care only approximate measures. A minim, the smallest accurate liquid measure, is equivalent to about one drop of an aqueous solution, but it makes three

or four of chloroform. The minim of any tincture is usually two drops, of a fluid extract but one.

APOTHECARIES' MEASURES.	FLUID MEASURES.
gr. xx = ℈ j;	♏ lx = f ʒ j;
℈ iij = ʒ j;	f ʒ viij = f ℥ j;
ʒ viij = ℥ j;	f ℥ xvj = O j;
℥ xij = ℔ j.	O viij = C j.

APPROXIMATE MEASURES.

1 teaspoon (holding 45 drops of pure water)	= about	ʒ j;
1 tablespoon	" "	℥ ss;
1 wineglass	" "	℥ ij;
1 tea-cup	" "	℥ iv;
1 coffee-cup	" "	℥ viij.

The gramme (gm.) of the French metric system equals about 15 grains. The cubic centimetre (c. c.) equals about 16 minims. The litre equals about 2 pints.

The gramme is the unit of weight; the Latin prefixes, deci, centi, milli, etc., are used to indicate its subdivisions, and the Greek, myria, kilo, hecto, deka, etc., its multiples, always on the scale of ten. In place of the decimal point, a vertical line is sometimes used, at the right or left of which the numbers are written, as:

myriagramme,	10,000	
kilogramme,	1,000	
hectogramme,	100	
dekagramme,	10	
gramme,	1	
decigramme,		1
centigramme,		01
milligramme,		001

The standard weights and measures should be thoroughly familiar to every nurse, and should be used in place of the ordinary unreliable measurements. It will be found an advantage to have also a ready comprehension of the symbols and abbreviations used in writing prescriptions. The numbers are expressed by Roman figures, and follow always the symbols to which they relate, as: ʒ j, ʒ jss., ℥ ij, gr. iij, ℈ iv, gtt. v, lb. vj, ♏ x, etc.

ABBREVIATIONS AND SYMBOLS.

ĀĀ, *ana*, of each.
Add., *adde*, add to it.
Ad lib., *ad libitum*, as you please.
Alt. hor., *alternis horis*, every other hour.
Alt. noc., *alterâ nocte*, every other night.
Applic., *applicatur*, apply.
Aq. dest., *aqua destillata*, distilled water.
Aq. pur., *aqua pura*, pure water.
B. i. d., *bis in dies*, twice a day.
C, *congius*, a gallon.
Cap., *capiat*, let him take.
Comp., *compositus*, compound.
Conf., *confectio*, a confection.
Cort., *cortex*, bark.
Decub., *decubitus*, lying down.
Det., *detur*, let it be given.
Dil., *dilutus*, dilute.
Div. in p. æq., *dividatur in partes æquales*, divide into equal parts.
Drachm., *drachma*, a drachm.
Emp., *emplastrum*, a plaster.
Fl. or f., *fluidus*, fluid.
Ft., *fiat*, let there be made.
Garg., *gargarisma*, a gargle.
Gr., *granum* or *grana*, a grain, or grains.
Gtt., *gutta* or *guttæ*, a drop, or drops.
Guttat., *guttatim*, by drops.
Inf., *infusum*, an infusion.
Inject., *injectio*, an injection.
Lb., *libra*, a pound.
Liq., *liquor*.
Lot., *lotio*, a lotion.
M., *misce*, mix.
Mist., *mistura*, a mixture.
N., *nocte*, at night.
No., *numero*, in number.
O., *octarius*, a pint.
Ol., *oleum*, oil.
Ov., *ovum*, an egg.
Pil., *pilula*, a pill.
P. r. n., *pro re natâ*, as occasion arises.
Pulv., *pulvis*, a powder.
Q. S., *quantum sufficit*, as much as is sufficient.
℞., *recipe*, take.
Rad., *radix*, root.
S. or Sig., *signa*, write.
Sem., *semen*, seed.
SS. or s., *semissis*, a half.
S. V. G., *spiritus vini gallici*, brandy.
S. V. R., *spiritus vini rectificatus*, alcohol.
Syr., *syrupus*, sirup.
T. i. d., *ter in dies*, three times a day.
Tr., *tinctura*, tincture.
Troch., *trochisci*, lozenges.
Ung., *unguentum*, ointment.
♏, *minimum*, a minim.
ʒ, *drachma*, a drachm.
℥, *uncia*, an ounce.
℈, *scrupulum*, a scruple.

LIST OF DRUGS IN COMMON USE.

Name.	Dose internally.	Effects to be looked for.	Remarks.
Aconite.		General sedative.	A powerful poison, to be used with great care. The preparations for external use should not be applied to an abraded surface, or to any part of the mucous membrane.
Ext. of leaves.	Gr. $\frac{1}{6}$ – j.	Lowered pulse, respiration, and temperature; increased action of skin and kidneys, irritation of fauces, tingling and numbness of extremities, muscular weakness.	
Tr. of root.	♏ j – v.		
Fleming's tinct.	♏ ss. – ij.		
Aconitine.	Gr. $\frac{1}{200}$ – $\frac{1}{100}$.		
Alcohol. Brandy, whisky, etc.	ʒ j +	Diminished excretions. In small dose, general stimulation, with slight rise of temperature. In large dose, reduces fever. Excitement followed by narcotism.	The most powerful cardiac stimulant known. Rarely given pure. Effects much modified by habit.
Alum.	Gr. x – xx.	Astringent or emetic.	Coagulates albumin; most used locally.
Ammonia.		Stimulant, antacid.	Volatile and of variable quality. Should be kept under a glass stopper, as it rapidly erodes cork.
Aqua.	♏ v – xxx.		
Aromatic spirits.	ʒ ss. – ij.		
Solut. of acetate.	ʒ j – ℥ ss.	Diaphoretic and antipyretic.	*Spirits of Mindererus.*
Carbonate.	Gr. iij – x.	Expectorant.	*Common Smelling Salts.*
Valerianate.	Gr. j – vj.	Nerve sedative.	
Anise.	Gr. x – xxx.	Carminative.	
Aristol.		Has similar properties to iodoform, but is odorless.	
Antifebrin.	Gr. iij – x.	Antipyretic and antineuralgic.	Antifebrin is less likely to upset the stomach than antipyrin, and has no injurious effect upon the heart.

ANTIMONY. Tartar emetic. Wine.	 Gr. $\frac{1}{32}$ – iij. ♏ v – ʒ j.	Alterative or emetic. Promotes all the secretions.	Mineral poison, in overdose inducing extreme prostration. Externally an irritant.
ANTIPYRIN.	Gr. x – xv.	Antipyretic and antineuralgic.	Look out for collapse after large doses.
ARSENIC. Fowler's solut'n.	 ♏ ij – x.	Antiperiodic, alterative, and tonic. Improves nutrition. In overdose a violent corrosive poison.	Especially used in skin affections. It should never be given on an empty stomach. Has occasionally a cumulative effect.
ASAFŒTIDA. Tincture. Mixture.	Gr. x in pill. ʒ ss. – ij. ℥ ss. – j.	Antispasmodic and somewhat laxative.	Used in nervous complaints, and some forms of dyspepsia. Imparts a strongly alliaceous odor to all the secretions
ATROPINE.	Gr. $\frac{1}{120}$ – $\frac{1}{60}$.	See Belladonna.	Active principle of belladonna.
BELLADONNA. Tincture. Ext. of root.	Gr. j – iij. ♏ v – xx. ♏ ij – iv.	Narcotic. Stimulates respiration, increases cardiac and peristaltic action. Dilates the pupils of the eyes. Dries the mucous membrane, and arrests secretion of milk. In large dose may occasion an eruption on the skin, dimness of vision, and delirium.	The physiological antagonist of opium. Used externally in the form of a liniment, unguent, or plaster.
BENZOIN. Tincture. Comp. tinct.	Gr. x – xx. ♏ xv – ʒ j. ♏ xv – ʒ j.	Expectorant and antiseptic. Stimulates the mucous membrane.	Used externally as an application to ulcers, etc.
BISMUTH. Subnitrate. Subcarbonate.	 Gr. v – xxx. Gr. v – xxx.	Checks nausea, and relieves dyspepsia arising from over-acidity of the stomach.	
BROMIDES. Of potassium. sodium. ammonium.	 Gr. viij – lx. Gr. viij – xxx. Gr. v – xxx.	Sedative, lessening the amount of blood sent to the brain, and quieting the nervous system.	Incompatible with acids. Often combined with chloral. Too prolonged use may induce a form of chronic poisoning — bromism — manifested by physical and mental weakness, anæmia, and eruption of acne.

LIST OF DRUGS IN COMMON USE—(*Continued*).

NAME.	Dose internally.	Effects to be looked for.	REMARKS.
CALOMEL.		See Mercury.	
CAMPHOR.		Stimulant, antispasmodic and diaphoretic, and anodyne. Camphorated oil given hypodermically is a powerful heart stimulant.	In large dose a narcotic poison.
Aqua.	℥ ss.–j.		
Spirits.	♏ v–xxx.		Contains camphor ʒ ij to alcohol Oj; will be precipitated by water.
CANNABIS INDICA.	Gr. ss.–ij +	Resembles opium in action, but does not, like it, diminish the appetite or check the secretions. Is less certain in effect.	*Indian Hemp*, or *Hasheesh*. The extract is of variable strength.
CAPSICUM. Tincture.	♏ v–xx.	Carminative. Good stomachic stimulant.	
CARBOLIC ACID.	Gr. ss.–ij.	Among the symptoms of overuse are nausea, faintness, heart failure, and a greenish shade in the urine, evident after standing for a time.	Most used externally as an antiseptic. Caustic when pure.
CASCARA SAGRADA. Fluid extract.	♏ xv–xxx.	Cathartic.	One of the best for habitual use.
CASTOR OIL.	℥ ss.–iss.	Cathartic.	Especially good for children and the puerperal state.
CHAMOMILE.		Aromatic tonic.	
Infusion.	℥ j–℥ ij.		To be made with cold water.
Oil.	♏ ij–x.		

CHLORAL HYDRATE.	Gr. x – xl.	Hypnotic and antispasmodic.	Does not relieve pain except in dangerous doses.
CHLORODYNE.	♏ x – xxx.	Anodyne.	Compounded of several powerful narcotics. There is one sixth of a grain of morphine in every 30 minims.
CHLOROFORM.	♏ v – xxx.	Anæsthetic. Relaxes the muscular system, and has a powerfully sedative effect upon the heart.	Chiefly given by inhalation.
Spirits of.	ʒ ss. – ʒ j.	Anodyne and antispasmodic.	
CINCHONA.	Gr. x – xl.	Antiperiodic, tonic, and antipyretic.	*Peruvian Bark.*
Cinchonidia.	Gr. iij – xxx.		"Cinchonism" is manifested by ringing in the ears, deafness, fullness of the head, trembling, and cardiac excitement.
Quinine.	Gr. j – xxx.		
Quinidia.	Gr. j – xxx.		
COCA.			
Fluid extract.	ʒ ss. – j.	Nerve stimulant.	
Cocaine.		Local anæsthetic. $\frac{1}{6}$ – $\frac{1}{10}$ gr. tablets, every $\frac{1}{4}$ hour, useful in vomiting, especially in pregnancy.	Great danger of forming cocaine-habit. When injected hypodermically may cause alarming cardiac depression.
COD-LIVER OIL.	ʒ j – ℥ ss.	Nutritive and tonic.	
COPPER.			
Sulphate.	Gr. $\frac{1}{8}$ – $\frac{1}{4}$.	As a tonic.	Irritant poison. Externally escharotic.
	Gr. iij – vj.	As an emetic.	
CORROS. SUBLIMATE.		See Mercury.	

LIST OF DRUGS IN COMMON USE—(*Continued*).

NAME.	Dose internally.	Effects to be looked for.	REMARKS.
CREOLIN.		Excellent antiseptic and deodorizer.	Used in solutions of 1–200, 1–400. Not poisonous even when taken internally, and does not injure instruments. One of the coal-tar derivatives.
CROTON OIL.	Gtt. $\frac{1}{4}$–ij.	Violent carthartic.	Externally, vesicant.
DIGITALIS.		Sedative, diuretic. In small dose, reduces the number of pulse-beats while increasing their force. In toxic dose, causes nausea, faintness, fall of temperature, and irregularity of the heart.	Cumulative in effect. Marked intermittence of pulse indicates immediate discontinuance.
Fluid extract.	♏ j–v.		
Infusion.	ℨ j–iv.		
Tincture.	♏ v–ℨ i.		
Digitaline.	Gr. $\frac{1}{60}$–$\frac{1}{30}$.		
DOVER'S POWDER.		See Opium.	
ELATERIUM.	Gr. $\frac{1}{12}$–$\frac{1}{8}$.	Strong cathartic and hydragogue.	Used in cases of uræmia.
EPSOM SALT.		See Magnesia.	
ERGOT.		Checks hæmorrhage; excites uterine contractions.	
Fluid extract.	ℨ ss.–j.		
Ergotin.	Gr. ij–iv.		If given hypodermically use *Squibb's* aqueous extract and inject deep into muscle.
ETHER.		Antispasmodic, anæsthetic.	Chiefly given by inhalation.
Sulphuric.	♏ x–xxx.		*Hoffmann's Anodyne.*
Compound spts.	♏ x–ℨ j.	Stimulant and anodyne.	*Sweets Spirits of Nitre.* Becomes strongly acid with age.
Spts. of nitrous ether.	ℨ ss.–ℨ j.	Diuretic, diaphoretic, and carminative.	

FOWLER'S SOL.		See Arsenic.	
GALLIC ACID.	Gr. v – xx.	Astringent.	Used to control hæmorrhages, especially intestinal and pulmonary.
GINGER.		Carminative and stimulant.	
Tincture.	ʒ ss. – j.		
GLAUBER'S SALTS.		See Soda.	
GRAY POWDER.		See Mercury.	
HIVE SIRUP.		See Squill.	
HOFFMANN'S ANODYNE.		See Ether.	
HYDROCHLORIC ACID.		See Muriatic Acid.	
HYDROCYANIC ACID.		See Prussic Acid.	
HYOSCYAMUS.		Narcotic.	Allied to belladonna. More hypnotic, but less efficacious against pain. Non-constipating.
Extract.	Gr. j – iij.		
Tincture.	♏ xv – ʒ j.		
Hyoscyamin.	Gr. $\frac{1}{90}$ – $\frac{1}{20}$.		
HYPOPHOSPHITES of lime, soda, etc.	Gr. iij – xv.	Nerve tonics.	
IODIDE OF POTASSIUM.		See Potassium.	
IODINE.		Alterative, stimulating the absorbent and glandular systems.	Symptoms of *iodism* are those of acute catarrh, with a saline taste in the mouth, and sometimes eruption of acne or ptyalism.

LIST OF DRUGS IN COMMON USE—(*Continued*).

Name.	Dose internally.	Effects to be looked for.	Remarks.
IODINE (*cont.*).			
Tincture.	Gtt. ij – x.		Decomposed by water. Externally an irritant. Should be much diluted for internal use.
Churchill's tincture.			Used locally, especially in gynecology.
IODOFORM.		Antiseptic, stimulant, and locally anæsthetic. In overdose, nausea, diarrhœa, heart failure, dusky urine, convulsions, or nervous derangement.	Externally used as a dressing for wounds, etc. Contains 29 parts in 30 of iodine, but has none of its irritant action.
IPECACUANHA.	Gr. ¼ – j. Gr. v – xx.	As an expectorant and diaphoretic. As an emetic.	In small dose, checks vomiting; in large dose, excites it.
Sirup.	ʒ ss. – iv.		
Wine.	♏ xv – ʒ j.		
Comp. powder.		See Opium.	
IRON.		Tonic; astringent. Increases number of red corpuscles in blood.	Should be taken after meals through a tube. Use needs to be long continued to be effective.
Dialyzed.	♏ x – xl.		The only preparation which is non-irritating, non-constipating, and does not blacken the teeth.
Albuminate. } Peptonate. }	ʒ ss. – ʒ j.		Much used for weak stomachs.
Tr. of chloride.	♏ v – xxx.		
Sirup of iodide.	♏ xv – xl.		
Subsulphate.			Styptic. *Monsel's Solution.*

JALAP.	Gr. viij – xxx.	Hydragogue cathartic.	
Compound jalap powder.	Gr. xxx – ʒ j.		Useful in uræmia.
LAUDANUM.		See Opium.	
LEAD.			
Acetate of.	Gr. j – iij.	Astringent.	*Sugar of Lead.* Often given in combination with opium. Symptoms of *plumbism*—chronic lead-poisoning—are loss of appetite, colic, constipation, a bluish line along the gums, failure of strength, impaired sensibility, paralysis of extensor muscles ("wrist drop").
LICORICE POWDER.	℥ ss. – ij.	See Senna.	
LIME-WATER.		Antacid and astringent.	To prepare, put an ounce of fresh lime in a quart bottle. Slake with a little cold water. Fill the bottle and keep well corked.
MAGNESIA.		Antacid.	
Carbonate.	ʒ ss. – ij.	Laxative.	
Sulphate.	ʒ j – iv.	Cathartic.	*Epsom Salt.*
Liquid citrate.	℥ vi – xij.	Cathartic.	
MERCURY.		Alterative, increasing glandular activity. In large dose, salivation, soreness of gums and teeth, foul breath, nausea, diarrhœa, muscular pains, and nervous phenomena.	Used externally in numerous forms, the constitutional effects always to be looked out for. Cathartics containing mercury, if not promptly effective, should be followed by some other purgative, to remove it from the system.

LIST OF DRUGS IN COMMON USE—(*Continued*).

Name.	Dose internally.	Effects to be looked for.	Remarks.
MERCURY (*cont.*).			
Bichloride.	Gr. $\frac{1}{30}-\frac{1}{10}$.	In overdose, violent poison.	*Corrosive Sublimate.* Most used externally as an antiseptic.
Mild bichloride.	Gr. $\frac{1}{12}$ – x.	As an anti-emetic or alterative.	*Calomel.*
	Gr. v – x.	As a purgative.	
Merc. with chalk.	Gr. ss. – x.	Alterative or purgative.	*Gray Powder.*
Blue pill.	Gr. j – xv.	Purgative.	
MORPHINE.		See Opium.	Alkaloid of opium.
MURIATIC ACID. Dilute.	Gtt. v – xxx.	Aids digestion and increases the secretions of the mucous membrane.	Of all the mineral acids, only the *dilute* forms are used medicinally. They should be taken through a tube, and the mouth afterward rinsed with a weak alkaline solution, as bicarbonate of soda.
NITRIC ACID. Dilute.	Gtt. ij – xx.	Similar to muriatic.	
NITRO-MURIAT. AC.	Gtt. ij – x.	Similar to muriatic.	
NUX VOMICA.		Tonic, affecting especially the nervous system. Laxative and somewhat diuretic. In overdose produces convulsions resembling those of tetanus, and death.	Sometimes has a cumulative effect.
Extract.	Gr. $\frac{1}{6}$ – ss.		
Tincture.	Gtt. v – x.		
Strychnine.	Gr. $\frac{1}{100}-\frac{1}{30}$.		
OPIUM.	Full dose, gr. j.	Narcotic. Lowers rate of pulse and respiration; checks all the secretions except that of the skin, which it excites abnormally. Contracts the pupils of the eyes, subdues pain, and induces sleep.	Children are peculiarly sensitive to its action, being sometimes seriously affected even by its external use.
Tincture.	♏ v – xxv.		*Laudanum.*

Camphorated tr.	ʒ j – ℥ j.		*Paregoric.* Dose for children ♏. v – xx
Compound tinc.	♏ x – xx.		*Squibb's Cholera Mixture.*
Deodorized tinc.	♏ v – xxv.		*McMunn's Elixir.*
Dover's powder.	Gr. x.	Diaphoretic, sedative.	*Compound Powder of Ipecac.* Each powder of gr. x contains 1 grain each of opium and ipecac and 8 of sulphate of potassium.
Liquid Dover's powder.	♏ x.		
Morphine.	Gr. $\frac{1}{10}$ – $\frac{1}{2}$.		One sixth of a grain of morphine is equivalent to 1 grain of opium. The U. S. solution contains 1 grain to the fluidounce; Magendie's, 16 grains. The latter is most used hypodermically.
U. S. solution of sulphate.	ʒ j – ij.		
Magendie's solution.	♏ v – x.		
PEPPERMINT.	ʒ $\frac{1}{4}$ – ʒ j.	Carminative and stimulant.	
PANCREATIN.	Gr. v – xv.	Digestive.	
PEPSIN.	Gr. v – xv.	Digestive.	
PERUVIAN BARK.		See Cinchona.	
PHENACETIN.	Gr. v – xv.	Excellent for the relief of neuralgic pain and headache. Has the good effects of opium without its bad effects.	In large doses reduces temperature, and acts as a hypnotic.
PHOSPHORIC ACID.	♏ x – xl.	Tonic and refrigerant.	After meals (see Muriatic acid).
POTASSIUM.			*Potash*, with lime, constitutes *Vienna Caustic.*
Acetate.	Gr. x – l.	Diuretic and laxative.	
Bromide.		See Bromides.	
Carbonate.	Gr. x – xxx.	Antacid, diuretic.	
Chlorate.	Gr. x – xxx.	Allays inflammation of mouth and throat.	The saturated solution (1 to 16) is commonly used as a gargle.
Iodide.	Gr. ij – xx.	Alterative. May give symptoms of iodism, which see.	

LIST OF DRUGS IN COMMON USE—(*Continued*).

NAME.	Dose internally.	Effects to be looked for.	REMARKS.
POTASSIUM (*cont.*).			
Nitrate.	Gr. x – xv.	Diaphoretic, diuretic, and sedative.	*Nitre, Saltpeter.*
Permanganate.	Gr. $\frac{1}{4}$ – j.	Disinfectant and deodorizing.	*Condy's Fluid* is a solution of the permanganate.
PRUSSIC ACID. Dilute.	♏ j – iv.	Antispasmodic and sedative. In overdose, a deadly poison.	Contains two per cent of the strong acid.
QUININE.		See Cinchona.	
RHUBARB.	Gr. v – xx.	Laxative.	Gives a yellow color to all the secretions.
Sirup.	ʒ ij – iv.		
Tincture.	℥ ss. – j.		
ROCHELLE SALT.	ʒ j – v.	Laxative.	*Tartrate of Potash and Soda.*
SALICYLIC ACID.	Gr. v – l.	Antipyretic, antiperiodic, and externally an antiseptic.	
SALOL.	Gr. v – x.	Resembles salicylic acid in its effects.	
SEIDLITZ POWDERS.	One of each kind.	Laxative.	The blue paper contains Rochelle salt and bicarbonate of soda, the white, tartaric acid. Dissolve each separately, and pour the larger into the smaller. Brisk effervescence should ensue. Lemon juice and sugar will improve the taste. The powders need to be kept dry.

SENNA.	ʒ ss. – ij.	Cathartic.	Prompt in action and safe, but apt to occasion griping.
Infusion.	℥ iv.		
Comp. licorice powder.	ʒ j – iv.		
SILVER.		Tonic and astringent.	Action antagonized by salt.
Nitrate.	Gr. $\frac{1}{4}$ – j.	Produces discoloration of the tissues, beginning inside the mouth.	
Fused nitrate.			*Lunar Caustic.*
SODIUM.			
Bicarbonate.	Gr. v – lx.	Antacid.	
Chloride.	℥ ss. – ij.	Emetic.	*Common Salt.* Salt solution (ʒ j – oj) is used for transfusion after hæmorrhage.
Sulphate.	ʒ ij – j.	Cathartic.	*Glauber's Salt.* All the saline cathartics are best taken before breakfast. They must be thoroughly dissolved.
SPIRITS OF MINDERERUS.		See Ammonia.	
SQUILL.	Gr. j – iij.	Expectorant, diuretic.	
Sirup.	ʒ $\frac{1}{4}$ – j.		*Hive Sirup.* Contains antimony, gr. j – f ℥, and is dangerous to use unadvisedly.
Comp. sirup.	ʒ $\frac{1}{8}$ – j.	Emetic.	
STRAMONIUM.			The dry leaves are sometimes rolled into cigarettes, and smoked for the relief of asthma.
Ext. of leaves.	Gr. $\frac{1}{4}$ – j.	Narcotic, similar to belladonna in action.	
Tincture.	♏ x – xx.	Depresses heart action.	
STROPHANTHUS.			Action similar to that of digitalis, without the disadvantages of that drug. May be given hypodermically.
Tincture.	♏ iij – x.	Powerful heart stimulant.	
STRYCHNINE.		See Nux Vomica.	

LIST OF DRUGS IN COMMON USE—(*Concluded*).

NAME.	Dose internally.	Effects to be looked for.	REMARKS.
SULPHONAL.	Gr. xv – xxx.	A useful and safe hypnotic.	Acts slowly. Give the first dose two hours before bed time. ʒ j may be given in all.
SULPHUR.	ʒ ss. – ij.	Alterative, antiseptic.	Is burned for purpose of fumigation.
SULPHURIC ACID. Dilute.	Gtt. x – xxx.	See Muriatic Acid.	
SWEET SPIRITS OF NITRE.		See Ether.	
TANNIC ACID.	Gr. ij – x.	Astringent.	Used to check hæmorrhages and mucous discharges.
TURPENTINE. Oil or Spirits of.	♏ v – ʒ ij.	Stimulates skin and kidneys, arrests hæmorrhages of mucous membrane, relieves the tympanites of typhoid. May induce strangury.	A small dose may be given on sugar; a large one, suspended in the yolk of an egg. Externally counter-irritant.
VALERIAN. Tincture.	ʒ j – iij.	Nerve sedative, not narcotic.	
ZINC. Oxide of.	Gr. j – viij.	Astringent and tonic.	Most used externally.
Sulphate of.	Gr. ss. – xxx.	Full dose a prompt emetic.	*White Vitriol.*

CHAPTER VIII.

Local applications — Counter-irritants: rubefacients, vesicants, pustulants—Cupping, dry and wet—Leeches.

BESIDE general remedies there are numerous local or topical applications, either irritant, soothing, or protective. Such as protect by arresting fermentation are called antiseptic. These will be spoken of later.

Counter-irritants relieve inflammation of the deeper parts by causing dilatation of the superficial capillaries and contraction of those in the inflamed tissues, probably through reflex nervous action. There are two distinct varieties—rubefacients, producing merely local warmth and redness, and vesicants, epispastics, or blistering agents. Still a third class produce a pustular eruption over the surface to which they are applied. Of this kind are Croton oil and tartrate of antimony.

Counter-irritants are applied usually over or near the seat of disorder, but sometimes at a remote part, to obtain what is called revulsive action. In this way mustard poultices on the feet, or a mustard foot-bath, may be employed for the relief of the head.

Mild counter-irritation results from hot fomentations and poultices, and from the various ammoniacal and camphorated liniments. One of the most commonly used rubefacients is mustard. To make a mustard plaster or sinapism, take one part of powdered mustard and

from two to five times the quantity of flour, according to the strength desired. Mix into a paste with tepid water, and spread it evenly between two pieces of muslin. Hot water or vinegar, often recommended, will weaken the active principle of the mustard ; and though, when made with tepid water, the plaster on first application feels cold, it soon gets warm. It should not be left on long enough to vesicate, as the sore produced is painful, and slow to heal. From twenty minutes to half an hour is usually long enough. With an insensible or delirious patient, the action must be carefully watched ; if neglected, deep ulceration may ensue. For a child, it is well to mix it with one third glycerin instead of pure water, as the action will be less severe, and it can stay on longer. Confine in place with a bandage. The burning sensation which follows the use of a mustard plaster may be relieved, if extreme, by dusting the part with flour or fine starch, or dressing it with vaseline, and covering with cotton to exclude the air. Cayenne-pepper plaster is made by mixing a tablespoonful of Cayenne into a thin paste of flour and water. Spread like a mustard paste. Or a quantity of red pepper may be stitched into a flat flannel bag, wrung out in warm water, and applied over the seat of pain. Rigollot's mustard leaves, the mustard paper, and capsicum plasters of the pharmacopœia, are prepared for use by simply dipping in tepid water. They are neat, quickly ready for use, and very effective.

Similar local stimulation may be obtained from bits of cantharidal plaster, kept on for an hour or two, but removed before the point of vesication is reached. These are called "flying blisters." The same effect follows the rapid passage of a hot iron over a piece of brown paper, or thin flannel, laid upon the skin. This will often re-

lieve lumbago or chronic rheumatism. Reddening only is desired. One use of the actual cautery is as a rubefacient. The burn produced by it is dressed like any other of little depth; usually with lint dipped in a solution of bicarbonate of soda, and covered from the air with rubber tissue.

To produce vesication, the agent most commonly employed is cantharides. This should not be applied where the skin is broken or tender. If it is very thin, as in case of a child, a piece of oiled tissue paper may be interposed between it and the cantharidal plaster. This is said to lessen the danger of strangury, while it accelerates rather than retards the action of the blister, as the active principle of cantharides dissolves in oil with great rapidity. The part should first be washed and dried, shaved if there is any hair upon it, and the plaster secured in place by a bandage rather than by adhesive strips, as the latter may be drawn upon painfully as the blister rises. This should take place in from four to eight hours. If it does not rise within twelve hours, it should be removed and a poultice applied, which will usually produce the desired effect. In taking off the plaster be careful not to tear the skin, and clean off with a little oil any adherent particles. When the blister is well raised, make a slight incision at the lowest point for the escape of the serum, and dress with oxide-of-zinc powder; or, the direction may be to leave the blister undisturbed, allowing the fluid to be reabsorbed. So far as the general effect is concerned, it is entirely immaterial which course is pursued. Ill effects, as strangury and congestion of the kidneys, sometimes follow the prolonged use of cantharides. It has been supposed even to have induced premature labor. Camphor corrects the action of cantharides upon

the bladder. For this reason, another method recommended of preparing cantharidal plaster for use upon a child is to sprinkle it with a solution of camphor in ether. The ether will evaporate in a few seconds, and a film of camphor be deposited evenly over the surface. A blister will usually be raised upon a young child in from two to four hours; it should be carefully watched, and not allowed to remain too long. Remove when the skin is well reddened, and poultice. The cantharidal collodion is a convenient form, well adapted to uneven surfaces, as it can not get out of place. One or two coats are applied by a camel's-hair brush ; if covered by oiled silk or rubber tissue it works rather more quickly. The tincture of iodine is applied in the same way; it is much milder in its action, several coats and repeated applications being usually required to produce a blister. If it burns too severely, it can be washed off by ammonia or alcohol.

When it is desirable to vesicate very quickly, stronger ammonia or chloroform is used. A piece of lint or cotton saturated with it is placed upon the skin, its evaporation being prevented and its irritating action limited by covering it tightly with a watch-glass, or the cover of a pill-box. A blister will be raised in five or ten minutes. This method is always painful; the ammonia, if left too long, will eat into the flesh.

Blisters should seldom be used in the case of the aged, or those whose circulation is poor, as they may cause extensive sores which are slow in healing.

Croton oil or antimonial ointment is rubbed into the surface with a piece of flannel, a very small quantity at a time, at intervals of four or five hours, until the eruption appears.

Cups are applied to relieve congestion, to abstract blood, or to prevent active absorption. For the relief of pain, dry cupping is the most practiced. It is an operation requiring much nicety in its performance. The articles needed are cupping-glasses—in the absence of the regular apparatus, small tumblers or wine-glasses with smooth edges may be used—a spirit-lamp, a saucer of alcohol, a stick with a bit of sponge or a wad of lint on the end, and plenty of soft towels. The lamp should stand between the patient and the alcohol. Have the cups perfectly dry. Dip the sponge in the alcohol, ignite it from the lamp, and let it burn for an instant in the inverted glass; then withdraw and extinguish it, at the same time rapidly placing the glass over the affected part. The heat will have rarefied the air in it, and as it condenses, on cooling, a partial vacuum is formed, to fill which the skin will be forcibly sucked up and the blood drawn toward the surface. Or, instead of using the torch, pack the bottom of the glass solidly with absorbent cotton, put a few drops of alcohol in the center, and ignite. Invert and apply while still burning. Each cup may remain on from three to five minutes, being removed before discoloration takes place. They can not be applied over a bony or irregular surface. A second cup must not be put in the ring left by a former one. Above all things, avoid burning the patient, either by using the alcohol too freely, so that it drips, or by getting the edges of the glasses too hot. To remove a cup, make pressure with a finger close to it, so that the air will be admitted. Dry it well before using it again. Dr. Quain advises that, instead of, as is usual, allowing a cup to remain stationary, it be slid back and forth along the surface. In this way the formation of effused circles is avoided, and a large tract can be

treated with one or two cups. Another apparatus consists of glasses furnished with rubber bulbs for exhausting the air. The nurse will not infrequently be called upon to practice dry cupping. Wet cupping is always attended to by the physician. A scarificator, lint, and adhesive straps will be required, in addition to the articles already mentioned. After cupping in the usual manner, the scarificator will be applied, making a series of slight cuts. The glasses will then be replaced. Or sometimes the scarificator will be applied before using them at all. When sufficient blood has been abstracted, the hæmorrhage can be easily stopped by pads of lint. A dry dressing, or some simple unguent, is all that is needed. Wet cupping is most frequently used in the lumbar region, to relieve inflammation of the kidneys.

Leeches are commonly used when it is desired to take a small quantity of blood from any locality. They affect a more limited space, and are preferable to cups if the parts are at all sensitive or inaccessible. There are two varieties, the American and the foreign. The former has three stripes down the back, the latter five or six. The foreign leech is larger and more voracious, drawing four or five times its own weight of blood. A leech will draw more blood from a young child than from an adult, owing to the thinness and greater vascularity of the skin. For this reason domestic leeches are generally chosen for children. They should not be applied over any large vessel, but over a bony surface upon which pressure can be made in case of excessive hæmorrhage.

There is sometimes difficulty in making leeches bite. The part to which they are to be applied must be perfectly clean, washed first with soap and water,

and again with pure water. The leech itself should be clean; it may be washed and dried in the folds of a towel, but never handled. Strong odors in the room, as of sulphur, vinegar, or tobacco will affect the leech; it may even refuse to bite when the patient has taken certain drugs internally. Various devices are proposed for inducing a leech to take hold; a slight scratch, just sufficient to give the taste of blood, will usually overcome any hesitation. Near the eye, or wherever the exact spot of attachment is important, a test-tube, leech-glass, or small bottle may be used to contain the leech. If the leeches are to be applied inside the mouth or nostrils, it is well to put threads through their tails. It will not interfere with their working, and will keep them from being swallowed. Should such an accident occur, they can be at once rendered harmless by drinking freely of salt and water. A leech should suck from three quarters of an hour to an hour. If they seem sluggish, they can be excited to action by gentle stroking with a dry towel. When full they will drop off. If you wish to take them off sooner, sprinkle a little salt on their heads. Never remove by force, or the teeth will be left in the wound, where they may occasion abscess or erysipelatous inflammation. The leech-bite leaves a permanent stellate scar. The bleeding may be encouraged by hot fomentations or poultices, or checked if too profuse, by a compress of lint, an application of ice, or, if it resists these, by touching with nitrate of silver. A patient should never be left for the night till all bleeding has ceased.

After they have been used, the leeches may as well be thrown away, as it is only after a long time and considerable care that they will ever be good for anything

again. Leeches not used may be kept in a jar of water, with sand and a little excelsior in the bottom, and having a perforated cover. The water must be changed every four or five days. A piece of charcoal in the water will help to keep it pure.

CHAPTER IX.

Poultices of various kinds—Fomentations—Modes of applying heat and cold locally—Lotions and similar applications.

POULTICES, also called cataplasms, are in common use as convenient means of applying warmth and moisture. Their effect is to soften the tissues and dilate the capillaries, relaxing the tension of inflamed parts, and so relieving pain. Applied early, they may check the progress of inflammation and prevent the formation of pus; when suppuration has set in, they facilitate the passage of matter to the surface and limit the spread of inflammation. They are useful not only when in immediate contact with inflamed tissues, but will also often relieve deep-seated pain. A poultice applied for the relief of the internal organs, or to hasten maturation, ought to be large enough to extend over a considerable surrounding surface, but over a suppurating wound should be but little larger than the opening. Apply as hot as can be comfortably borne, but do not burn the patient. There is danger of this with the thin and sensitive skin of a child, and in cases of paralysis, when the generally lowered condition gives rise to an inability to resist heat and cold, and the skin may be blistered by a poultice that would produce little effect on a healthy subject. Cover with some impervious material —oiled muslin or rubber tissue—to keep in the heat,

and change frequently, the exact time depending upon the thickness of the poultice. One of ordinary size will keep warm for three or four hours. If allowed to become cold and hard, it will do more harm than good. Poulticing should not be too long continued, or it may retard rather than help the healthy processes, by rendering the flesh sodden and irritable; it may even develop an eruption.

Poultices are made of various materials. The simplest form consists of several thicknesses of lint or soft cloth, wrung out in hot water. A convenient but expensive substitute is spongio-piline, which is made of two or three layers of sponge and wool, felted together, and coated on the outer surface with caoutchouc. This holds the heat a long time.

Linseed meal is very generally used, and when of good quality is an excellent material. To make a linseed poultice, bring a saucepan of water to the boiling-point, and, without removing it from the fire, stir into it the meal little by little, until it has the proper consistency—just thick enough to be cut with a knife. It must be smooth and perfectly free from lumps. That eccentric old genius of the last century, Dr. Abernethy, says that, if it is perfectly worked together, you might throw your poultice up to the ceiling, and it would come down without falling in pieces. The poultice should be spread evenly, about a quarter of an inch thick, upon a piece of muslin previously cut to the desired size, leaving an inch and a half of margin in each direction. Bartholow advises that the muslin be twice the length of the intended poultice, only half of it spread, and the remainder folded back as a cover, but it is rather better to have a separate cover of some thinner material, as mosquito-netting, old tulle, or illusion,

if such can be obtained, and to fold over together like a broad hem the edges of both. This makes a strong border. The cover is sometimes entirely omitted, and the poultice applied directly to the skin, but portions of it are likely to adhere, so that it becomes difficult to remove it neatly A little oil on the poultice will help to keep it soft, and make it less likely to stick. A layer of cotton-wool on the outside will help to retain the heat; and when the weight of a poultice is painful, and it has in consequence to be made thin, it will be found a valuable addition. Sometimes a flannel bag is made to contain the poultice, one end being left long and free to fold over it. The best way to apply a large poultice for the relief of the internal organs is to make one or two turns of a flannel bandage about the part, and then to apply the poultice in such a bag and confine it in place with the rest of the bandage. So arranged, it will keep hot a long time.

A small board, or a tray, on which to carry the poultice to the patient, will be found very convenient, and is in hospitals always used. Quite as important is it to have a basin in which to carry away the old one. If it is to be applied to a wound, the old poultice will have been removed, the wound washed, and protected by a "guard"—a piece of muslin wet with some disinfecting solution—before the fresh one is made.

A poultice-jacket is sometimes prescribed, to envelop the entire chest. This is made in two pieces, front and back, with strings to tie over the shoulders and under the arms. The edges must be firmly sewed, to keep the poultice from escaping.

Bread poultices are lighter and more bland than linseed, but cool quickly and hold less moisture. Not having the tenacious quality of linseed, they are likely to

crumble and become rough as they dry. Milk ought never to be used in their preparation, as it has no advantage over water, and it very soon becomes sour and offensive. Pour boiling water over slices of bread without crust. Let them simmer a few moments until well soaked, then drain off the water, beat up the bread quickly with a fork, and spread.

As bread is more porous than linseed, it forms a better basis for the charcoal poultice. The formula given is: Fresh wood-charcoal powder, ℥ ss.; bread crumbs, ℥ ij; linseed meal, ℥ jss.; boiling water, ℥ x. Mix half the charcoal into the poultice, and sprinkle the rest either over its surface or directly upon the wound. This poultice needs very frequent renewal. It is used for putrid sores; it absorbs the fetid odor and promotes a healthy condition, but it is always a dirty application, and other neater and equally effective antiseptics have largely taken its place. A linseed poultice may be made with some disinfectant solution instead of pure water, as weak carbolic acid, bichloride of mercury, or solution of chlorinated soda. The latter, as well as correcting the odor, affords moderate stimulation to the wound. It is made in the proportion of one part Labarraque's solution to four of water. Another gently stimulant application is the yeast poultice, mainly used to hasten the separation of gangrenous sloughs. Mix six ounces of yeast with the same quantity of water at blood heat; stir in fourteen ounces of wheat flour, and let it stand near the fire till it rises. Apply while fermenting. Another recipe given for the yeast poultice is: Mix a quarter of a pound of flour, or linseed meal, with two ounces of yeast or beer grounds. The mixture is then heated, being constantly stirred until it is warm. The former is officinal. Dough, just as mixed for bread,

will answer the purpose of a yeast poultice admirably. It is not necessary to wait for it to rise, as the heat of the body will cause it to do so. Put a sufficient quantity in a muslin bag, allowing plenty of room for it to rise.

Starch makes a very bland poultice, and retains the heat well. It is used for cancers and to allay the irritation of skin diseases. Make as for laundry use; mix first with cold water, and then add boiling water until it thickens.

Powdered slippery elm, Indian meal, and oatmeal are also used for poultices. A very light and soothing one may be made of one part slippery elm to two parts linseed meal. Scraped carrots, boiled or raw, are thought to have an especially cleansing effect; onions and horse-radish are sometimes used for their stimulating properties. A hop poultice is a thin bag loosely filled with hops and wrung out in hot water. Bran is treated in the same way. A bran jacket may be made like that of linseed, above described, and has the advantage that the same one can be rewet and used again and again. It needs to be stitched through and through, as well as round the edges, to keep the bran in place. Bandage close to the body with a wide roller.

Laudanum is often added to a simple poultice, or sprinkled over its surface, for the relief of pain. Another sedative poultice sometimes ordered consists of one part powdered hemlock-leaf to three parts linseed meal. In either case the constitutional effects of the drug are to be looked out for.

Camphor, incorporated in a bland poultice, is sometimes applied to the perinæum for the relief of strangury.

A spice poultice is made by mixing ginger, cinna-

mon, clove, and Cayenne pepper, a teaspoonful of each, with half an ounce of flour, and brandy enough to make a paste. The same effect, that of mild counter-irritation, may be produced by sewing the spices into a bag, to be dipped into whisky or brandy when required for use.

A mustard poultice is made by the addition to a simple linseed poultice of a prescribed proportion of mustard, usually from one eighth to one fourth. A good substitute for a mustard poultice may be made by dipping a clean flat sponge into mustard paste prepared in the usual manner. Fold this in a handkerchief or piece of muslin, and apply. The poultice may be renewed by simply moistening the sponge afresh with warm water, its strength being perfectly preserved.

Fomentations are poultices in modified form, applications of hot water, pure or medicated, by means of pieces of flannel or flat sponges. They have the advantages of being clean, light, and quickly prepared; but they require constant attention, needing to be changed every ten or fifteen minutes. Two pieces of flannel should be at hand, each doubled to the desired size. These are called stupes. They are to be saturated with boiling water, and wrung out as dry as possible. For this purpose a stupe-wringer is needed—a piece of stout toweling with a stick run through the hem at each end. Put the stupe in the middle of this, saturate with boiling water, and twist the sticks in opposite directions until no more water can be squeezed out. A towel may be used as a wringer, but there is danger of scalding one's fingers. A stupe cool enough to be wrung out by hand is too cool to be of much use. It should be dry enough not to wet the bed or the clothing. Have another all ready to apply before removing the first. There

should be two layers, no more. Shake these slightly apart to let the air in between them, and they will keep hot longer. Cover with oiled muslin, an inch larger in each direction than the stupe, and over that lay a piece of dry flannel, or a layer of cotton-wool. The stupe should never be allowed to get cold. After the fomentations are discontinued, carefully dry the part to which they have been applied, and keep it covered for a time with a warm, dry flannel. Fomentations are not applied to discharging wounds, as the stupes would at once be soiled. Their chief use is to relieve spasm of the internal organs. They may be made more irritant or sedative by the addition of appropriate medicaments. Twenty or thirty drops of turpentine or laudanum may be sprinkled over each stupe, or it may be steeped, instead of pure water, in some remedial decoction, as of poppy-heads, hops, or chamomile flowers. A stupe recommended for a child consists of Jamaica ginger, paregoric, and hot water, in equal parts. In using turpentine there is some danger of blistering the skin, and any sore spot must be first covered with some impervious dressing.

When it is better to avoid relaxation of the tissues, "dry fomentations" are employed. Toasted flannel is often used, but it does not retain heat well. Thin bags of heated sand, ashes, or salt, bran or hops, hot bricks, plates, tins, and water-bottles, and all applications of dry heat come under this head. Hot-water bottles and bags should in every case have a covering of flannel which can not be displaced. An undershirt or large stocking will serve the purpose. With a child, or an unconscious patient especially, you can not be too careful about this. There are several cases on record in which patients after an operation, and before recovering from the ether, have

suffered severe burns in consequence of an uncovered heater coming in contact with the skin. An occurrence of this kind results from a degree of carelessness on the part of the nurse which is simply unpardonable.

Hot applications are usually better than cold, the latter being used chiefly to subdue inflammation. They are good only in its earliest and latest stages, never when matter is forming or during sloughing. To be of any use they must be kept cold, and confined to a limited space. If the treatment is begun and suspended, the reaction will render the inflammation more severe than if it had never been undertaken.

The simplest method of applying cold is by pieces of muslin laid on ice, and changed for fresh ones before they get warm. This calls for constant attention. The bed must be well protected; in all applications of water care must be taken that neither it nor the patient's clothing gets wet.

Ice is best applied in a rubber bag. These come in different shapes to fit the various parts of the body. The bag should be not more than half filled, with bits less than an inch square, and the supply be renewed before the last piece is melted. The ice will keep longer if mixed with one third sawdust. Put a muslin cover on the ice-bag, and confine it with a bandage so that it may not slip about An ice-bladder for application to the head can be folded in a napkin and pinned in position upon the pillow, so that its weight will not press upon the head. In the absence of a regular ice-cap a cap-shaped sponge may be used, which will absorb the water as it melts. This must, of course, be wrung out before it is saturated. Ice can be finely broken by wrapping it in a stout cloth and pounding it Coils of rubber or lead-tubing are now extensively used as a sub-

stitute for the ice-bag, especially in surgery, ice-water being siphoned through them from a tub placed at an elevation above the bed.

All *evaporating* lotions must be left uncovered. A single thickness of lint or muslin is used, and frequently wet. Do not use flannel, or you may get a blister. Such are alcohol, vinegar, muriate of ammonia, etc.

Other lotions are put on several folds of lint, laid on the affected part, and covered closely with oiled muslin, or rubber tissue. The lint can be re-wet without taking it off by pouring some of the lotion over it.

A lotion applied to the eye is known as a collyrium. Collyria should be introduced at the outer angle of the eye, either by a glass dropper, or a camel's-hair brush used for nothing else. Draw down the lower lid, and tell the patient to look up at the instant the drops are slid in. Moist cloths must never be bound tightly upon the eyes, or they will assume the nature of a poultice, always harmful to those delicate organs.

Liniments differ from lotions in their mode of application, being rubbed in until the part is dry. Liniments usually contain poisonous ingredients, and must be used with care, the hands afterward being well washed before touching any sensitive spot.

Ointments are either spread on lint the exact size required or are rubbed in like liniments. The rubbing in of an ointment is termed inunction.

The interior of the throat may be treated by gargles or by insufflation, as well as inhalation, already described. Gargles are fluids brought in contact with the tonsils and forcibly agitated by the air from the larynx. About a tablespoonful at a time should be used, four or five times successively. After an acid gargle the mouth should be well rinsed with some alkaline solution, as bi-

carbonate of soda or lime water, to prevent injury to the teeth.

For insufflation a rubber air-bag especially designed for the purpose may be used, or a large quill, a piece of glass tubing, or even a hollow roll of stiff paper, filled with the prescribed powder. This is placed as far as possible back in the throat, and its contents either blown in by the operator, or forcibly inspired by the patient.

The nasal douche, once so common, is now seldom prescribed, as there is danger attending its use. If it is followed by pain in the ears it should not be repeated. The use of the post-nasal syringe and the spray has almost entirely superseded that of the douche.

CHAPTER X.

The intestinal tract: Enemata: purgative, refrigerant, anthelmintic, astringent, nutritive—Care of appliances—Suppositories.

The intestinal canal is formed by the folds of a single long tube, some twenty-five or thirty feet in length. That part of it nearest the stomach is called the small intestine—various subdivisions, respectively, the duodenum, jejunum, and ileum; the last five or six feet are of much greater diameter, and are therefore spoken of as the large intestine. This also is subdivided into the cæcum, the colon—ascending, transverse, and descending—and the rectum. It is not directly continuous with the small intestine. The enlargement is abrupt, at right angles to the ileum, and separated from it by a valve. This ileo-cæcal valve allows free passage to the contents of the small intestine, but firmly resists pressure from the cæcal side. At the end of the cæcum is a small closed tube, called the vermiform appendix, the uses of which are unknown. It is frequently the seat of serious inflammation known as appendicitis. A continual motion is kept up in the intestines, by means of which their contents are propelled along. These movements are termed peristaltic. The process of digestion is completed in the small intestine; whatever passes beyond this is merely the waste and innutritious

residue of the food, and undergoes no further digestive action. The intestines and all the other abdominal viscera are bound together and held in place by a strong membrane, the peritonæum.

An enema, or clyster, is a fluid preparation for injection into the rectum. Enemata may be used to secure or control evacuations of the bowels, to obtain remedial effect, local or general, or for the administration of nourishment. According to the purpose for which they are given, they may be classified as purgative, emollient, astringent, sedative, anthelmintic, stimulant, nutritive, etc.

Purgative enemata are in general use for the relief of constipation. They produce the desired result not simply by washing out the accumulated fecal matter, but by distention of the rectum and lower part of the bowel, occasioning a reflex stimulation, and increased peristaltic action of the whole intestinal tract. They are found to act efficiently even when the matter is lodged high up in the intestine, beyond the ileo-cæcal valve. A small enema often fails when a large one would be operative. To an adult should be given from one to four pints; a child requires but half as much, and for an infant one or two ounces will be sufficient. Having carefully protected the bed, place the patient on the left side, with the knees flexed. In an obstinate case, an advantage will be gained by adopting the Sims, or the knee-chest position. If the rectum is packed, it may be necessary to remove some of the fecal matter with the fingers before the tube of the syringe can be introduced. Ordinarily the rectum will be found empty, the accumulation being in the lower part of the colon above the sigmoid flexure.

Pass the fluid several times through the syringe to

expel the air; oil the nozzle and insert it very gently upward, slightly backward, and toward the left. Under no circumstances use force. See that the end of the tube moves freely in the rectum, neither pressed against the sacrum nor imbedded in a fecal mass. Give the injection very slowly; sudden distention of the rectum will produce an immediate and imperative desire for relief. It is a process about which it is impossible to hurry. If the patient complains greatly of pain, rest a little; after a delay of a few moments you can usually go on without causing distress. The anus may be supported by a folded towel, or, where there is little control of the sphincter, two or three fingers will have to be passed into the rectum by the side of the tube. After the desired amount has been injected, remove the tube gently, and, continuing to support the anus, keep the patient perfectly quiet for ten or fifteen minutes. If a full enema can be retained for this length of time, there will in ordinary cases be little doubt of a satisfactory result. A bulb syringe, as the Davidson, is perhaps the best for giving a purgative enema, as the force of the flow can be regulated by hand and arrested temporarily if desired. Nothing requires more care than the proper administration of enemata, and the most frequent reason for failure is that the nurse does not take time enough. A most effective method is to throw the fluid high up into the bowel through a soft rubber tube connected with the syringe. This is known as a high enema. The tube should carry the fluid above the sigmoid flexure, and must of course be introduced with great care. A No. 12 male elastic catheter can always be obtained of the druggist. It should first be softened by dipping it in warm water. Water alone may be used for the injection, or, where something more stimulating is called for, various medicaments

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are added, as soap, salt, olive or castor oil, ox-gall, etc. A drachm of glycerin will add greatly to the action of an enema, or a saturated solution of Epsom or Rochelle salts may be used. In obstinate constipation and intestinal obstruction nothing is so effective as a high enema containing ℥ xij–℥ xvj of molasses. For ordinary cases soap-suds are excellent and convenient. An enema of this sort may be rendered more certain in its action by the addition of a couple of ounces of oil and half an ounce of turpentine; these, with a small quantity of the soap-suds, should be first injected, and followed by the bulk of the fluid. An injection of olive oil, ℥ iv–vj, may be given half an hour before one of water, and, allowed to remain, in order to soften the fecal mass. After any operation upon the genital organs or the anus, where there is likely to be a strain upon sutures, such an enema may be given before each movement. Oil should always be warmed, as, when cold, it is too thick to pass through the syringe readily. Another enema exceedingly useful for softening scybalous masses in the rectum is of a solution of inspissated ox-gall. It should be retained for about an hour, and then be followed by a large enema of soap-suds. This is used especially after operation for laceration of the perinæum through the sphincter.

The habitual use of large evacuant enemata is to be discouraged, as causing undue distention and a somewhat torpid condition of the bowels.

As to the best temperature for evacuant enemata, authorities differ. Hot or cold water will naturally excite the intestines to more vigorous action than water of the same temperature as the body, but not so much of it can be taken. Either may be used without inconvenience to the patient. The daily injection of a pint of

cold water is often advised in case of constipation attended by bleeding hæmorrhoids.

Injections of ice-water are sometimes given to check hæmorrhage from the bowels.

When there is an irritable condition of the mucous membrane, enemata of a more soothing nature are indicated. Thin gruel is often used, or a decoction of flaxseed, starch, or barley. Emollient enemata should always be warm.

Hot rectal injections are used to relieve pelvic congestion, also in dysentery.

Anthelmintic enemata are given to destroy worms. Only a small quantity need be used: for an adult half a pint is sufficient, for a child still less. The remedy to be employed will be prescribed by the physician to suit the case. Salt, quassia, aloes, tincture of iron, and weak carbolic acid are among those used. Avoid making the solution too concentrated, as it may excite inflammation.

To check diarrhœa enemata of starch are frequently given, thin enough to pass readily through the syringe, to which has been added a prescribed quantity of laudanum, usually about thirty drops to two fluid ounces of starch. These may be ordered after each movement, or regularly every few hours. The action is at once sedative and astringent. Other astringents, as sulphate of copper or acetate of lead, are sometimes similarly employed.

Sedatives are given by rectum for the relief of pain, especially in the region of the pelvis. It takes, as a rule, a third more of any drug than the dose given by mouth to produce the same effect *per rectum*. Any rectal injection intended to be retained must be given very slowly, in quantity not exceeding three ounces, and of a

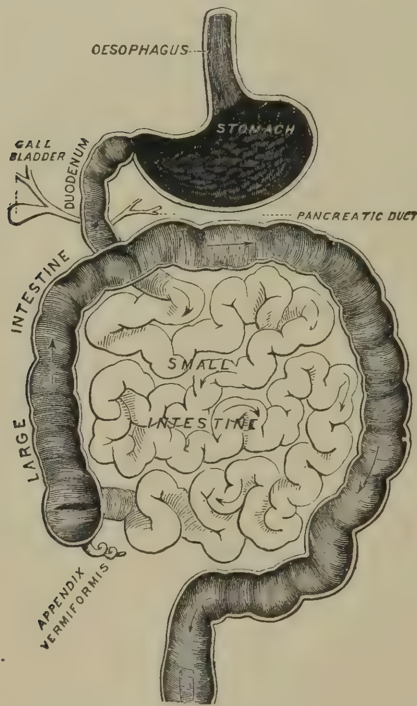
temperature not less than 100° Fahr. Quiet must be enforced for some time after it is taken. A good instrument is a hard-rubber syringe holding the exact quantity, to which a long flexible rectal tube is attached. A high enema can be given oftener and retained longer than when the short tube only is used. Care must be taken not to introduce air at the time of administration of the enema. An ordinary stomach-tube of medium size is an excellent appliance with which to give the enema, and, in addition, is much more free from danger than the hard rectal tubes. A piece of rubber tubing may be attached to the stomach-tube, and to this a small funnel. The fluid to be administered is poured into the funnel and allowed to appear at the eye of the stomach-tube; this will exclude the air. The tube is now held firmly, so that the fluid may not escape. It should have been previously lubricated, and after being introduced into the rectum for a distance of six or seven inches, the fluid is allowed to flow, the funnel being elevated. Especially do these directions apply to nutrient enemata, which are used when sufficient food can not be received or disposed of by the stomach. The possibility of nourishing in this way is often the means of saving life. Any highly concentrated liquid food may be given. Beef-extracts are most often used. Defibrinated blood has been thought valuable. Brandy, or some other form of alcoholic stimulant, is often given, together with the nourishment, but it is so irritating that its use can not be long continued. As food given by rectum has not been through the regular digestive processes, it must, to be easily assimilated, be subjected to artificial digestion; therefore, pepsin or pancreatic extract is commonly added to it Solutions having a slightly acid reaction are absorbed

with the greatest facility. These injections should not be given too frequently, or they may fail to be retained; absorption is slow, and the rectum not very tolerant of foreign matter. Once in five hours is often enough, and three ounces the maximum quantity. If so much can not be borne, try two or one at a time. Before giving a nutrient enema, it is important to ascertain whether or not the rectum contains fæces. If it is not found empty, it will be necessary to give first a purgative enema. It will often be found that after the rectum has been filled several times, the non-absorbed residue will decompose and of itself cause irritation. This can be avoided if the rectum is occasionally irrigated.

After using a syringe, clean it by letting plenty of warm water run through it, wipe it on the outside, and hang it up by the extreme end to drain. Never put it away in the box wet. A hard-rubber syringe shrinks in drying, and if left long unused will be apt to leak, but this can be remedied by soaking in hot water. A bed-pan should always be warmed before use by dipping in hot water. Dry it carefully, and, if any difficulty is found in adjusting it, oil the edges. Have a little disinfecting solution in it. For a very thin patient pad the edges.

Suppositories are solid bodies for introduction into the rectum, answering, to some extent, the same purposes as enemata. They are of various sizes, conical or spherical in form, and, while firm enough to retain their shape under ordinary conditions, are sufficiently soft to melt under the heat of the body. They are usually made of cacao butter, in which some medicinal agent is incorporated. They have the advantage of facility of application, and, being of little bulk, are easily retained.

Opium is often given in this form for the relief of local pain or diarrhœa. Suppositories of soap or boiled molasses are given to children for laxative purposes, and



The alimentary canal.

are very effective. A suppository, having been first oiled, should be introduced very gradually and gently into the rectum, the patient lying on the left side as for an enema. It should pass well beyond the sphincter ani, and it is well to keep the finger applied for a mo-

ment, until the rectum becomes accustomed to its presence, to lessen the danger of its immediate expulsion. Suppositories containing one drachm of glycerin are now often used in place of enemata. They usually produce an effect within fifteen or twenty minutes by setting up uniform peristaltic action and increasing the secretion from the intestinal glands.

CHAPTER XI.

The excretory organs—Normal urine—Variations from the normal in health and disease—The examination of urine—Tests for albumen—Test for sugar—Retention and suppression—The use of the catheter—Washing the bladder.

THE principal elimination of waste matter from the body is through the kidneys. These are two bean-shaped bodies, each about four inches long, lying in the lumbar region, one on either side of the spine. The urine, as it is excreted by the kidneys, passes through two connecting tubes—the ureters—into the bladder, whence it is periodically discharged through another tube—the urethra. The capacity of the bladder, fully distended, is about three pints. The urethra in the adult female is an inch and a half or two inches in length, in the male eight inches.

Urine, in a healthy condition, consists of some 960 parts of water to 40 of solid matter, principally urea—the chief waste product of animal life. The average quantity of urine passed in the twenty-four hours is two and a half pints, or forty fluid ounces. This will contain from 450 to 600 grains of urea, besides a small proportion of uric acid, and various phosphates, urates, and chlorides. It is transparent, of pale amber color, having a characteristic aroma, an acid reaction, and a specific gravity of 1020.

There may be considerable deviations from the above standard, even strictly within the limits of health. The quantity will vary in proportion to the amount of fluid taken into the system, and to the activity of the skin. When there is free perspiration, less water is left to be carried off by the kidneys, and, consequently, the urine is less abundant, darker in color, and of greater specific gravity, owing to the increased proportion of solid matter. The specific gravity may vary from 1010 to 1035 without indicating any departure from health. The reaction may for a time become neutral or even alkaline after a meal, owing to the character of the food taken. Diminished transparency may be due to the presence of the earthy phosphates, or the mixed urates of sodium, potassium, calcium, and magnesium, or to mucus from the genito-urinary tract.

The same causes of variation may exist to an extreme degree in sickness. The quantity may be diminished to two or increased to two hundred ounces. The color may be affected either by diminution of the normal coloring matters or by the addition of abnormal ones. Opacity may be occasioned by the presence of pus. Blood gives a characteristic smoky hue to acid urine; with an alkaline reaction, it is more nearly red. Urine containing blood enough to be readily recognizable as such is probably albuminous. Bile imparts a greenish tinge, often seen with jaundice. In some cases the urine becomes viscid or glutinous; in a variety known as chylous urine, there is an increased consistency, owing to an addition of molecular fat. In hysteria, alcoholism, anæmia, and convalescence from acute diseases, the urine may be expected to be pale and abundant. In the early stage of acute fever the specific gravity is likely to be high, as a large amount of solid

matter is excreted. Lowered specific gravity is most significant when it attends diminished quantity of urine. In diabetes mellitus, the specific gravity of the urine may be as high as 1050, while at the same time the quantity is largely increased. This is due to the presence of sugar. In the disease known as diabetes insipidus, or polyuria, there is an abundant flow of pale urine, but it contains no sugar or albumin, and the specific gravity is proportionately low.

It has already been noted that the food taken may be of a sort to occasion temporary variations in the character of the urine. Certain drugs also produce specific effects upon it. Turpentine taken internally gives to the urine an odor resembling that of violets. It sometimes increases the flow, and sometimes causes retention. Cantharides may also cause retention, or slow and painful passage of urine, known as strangury. Dark, smoky urine is one of the early symptoms of carbolic acid or iodoform poisoning Santonin gives a brilliant yellow color; rhubarb or senna, a reddish yellow; cubebs, copaiba, and sandal oil, each imparts its peculiar odor. Medicines which increase the quantity of urine are called diuretics.

It will be seen that many important indications may be derived from careful observation and examination of the urine. The nurse should always be able to report the frequency of micturition, the quantity passed, and any evident peculiarity. A specimen for examination should be taken either from the total accumulation of the twenty-four hours, or from that passed before breakfast. In warm weather even healthy urine can not stand for twenty-four hours without becoming decomposed. It is best kept in a tall, narrow glass, tapering toward the bottom, covered with a loose paper cap to

keep out the dust. In getting a specimen for the doctor, or for your own thorough examination, care must be taken to have it free from all impurities. Six or eight ounces will be wanted. Put it in a clean bottle with a clean cork, and label distinctly with the name of the patient, the date, and the full quantity of which it is a sample. It may be necessary to use the catheter in order to obtain it free from mucus; this is especially true in the case of women with leucorrhœa or vaginal hæmorrhage. Whether or not there is any appreciable sediment, a portion should be set aside for twelve hours, in which time sediment sufficient for microscopic examination may be deposited. Note whether the urine is turbid when first passed, or only becomes so after standing, the quantity and character of the sediment, and whether it floats or sinks.

To determine the reaction, test with litmus paper. If acid, it will turn the blue red ; if alkaline, the red to blue; if neutral, it will have no effect upon either. Urine having an acid or neutral reaction may turn alkaline after standing, but that which is alkaline in the beginning never becomes acid. After standing a short time at a moderate temperature the acidity often increases, but after a longer time, and especially in warm weather, the reaction becomes alkaline, with an ammoniacal odor and a precipitation of sediment. Alkalinity, owing to the presence of ammonia, may be distinguished from that due to the fixed alkalies, potash, or soda, by drying the litmus paper which has been changed by it. If the alkali is volatile, it will disappear, and the paper resume its red hue; otherwise, the blue will be permanent.

The urinometer should have been first tested with distilled water, into which it should sink to 1000. The

urine should be well shaken, the glass containing it not too small, as the urinometer must not be allowed to touch its sides. Drop it in the middle, and note carefully the point at which it rests.

Foreign matters in the urine may be either sedimentary or in solution. The most common sediment is composed of the urates and phosphates. They subside into a white or pink deposit. They may be distinguished from each other by boiling a little of the urine in a test-tube over the spirit-lamp, the urates being dissipated by the heat, while the phosphates are precipitated. The latter may be dissipated by adding a few drops of nitric acid. Mucus is unaffected by heat, acids, or alkalies. Pus will be deposited as an opaque white sediment, sinking rapidly so long as the reaction is acid and there is no mucus in which it may be suspended. It resembles the urates, but is not, like them, dissolved on the application of heat. In Bright's disease albumin is present, and often casts of the tubules of the kidney. The latter are evident only upon microscopic examination. Mucus and pus also can only be positively identified by the microscope.

Urine to be tested for albumin, should first be filtered, if not perfectly clear. Fill a test-tube to one third its depth, and, if the urine is not of distinctly acid reaction, add one or two drops of acetic acid to make it so. Boil for a moment and then hold it up to the light. Any opacity appearing will be due either to albumin or earthy phosphates. If the latter, it will disappear upon the addition of a few drops of nitric acid. If the fluid remains quite clear after boiling, set it aside for twelve hours, in which time a sediment may be deposited. Anything except albumin will disappear upon a second boiling.

If the proportion of albumin is but small, it may be held in solution by a slight excess of acid, on which account the following treatment is perhaps more reliable:

Fill a test-tube to the depth of half an inch with pure nitric acid. Add to this, by means of a small glass tube, an equal quantity of clear urine, putting it in so gently that it will not mix with, but just overlie, the acid. This can be done by inclining the test-tube and gently rotating the pipette. If there is albumin in the urine, it will appear at the surface of contact as a white zone, of varying thickness in proportion to its quantity. A similar white band may be formed by the mixed urates, if present in excess; but this may be dissipated by heat, while the albumin will be still further defined by it.

Heat precipitates albumin.
" " phosphates.
" dissolves urates.
Nitric acid precipitates albumin.
" " " urates.
" " " dissolves phosphates.

Pale urine produced in large quantity, and at the same time of a high specific gravity, should be tested for sugar. A specific gravity of more than 1030 is sufficient to excite suspicion of its presence. If there is albumin in the urine, it should first be removed by boiling and filtration.

A pretty and delicate test for sugar is by means of Fehling's solution, of sulphate of copper and tartrate of sodium. This needs to be kept tightly corked, and in the dark, as it is decomposed by the action of light. Dilute with five times its bulk of water, and boil. If a precipitate, or change of color, appears on boiling, the

solution is worthless, and a fresh one must be prepared. Add, drop by drop, an equal volume of the suspected urine, when, if sugar is present, a precipitate will appear, varying in color from light-yellow to orange-red, according to the quantity of sugar present.

An absence of the urinary excretion, owing to a failure of the kidneys to act, is known as *suppression.* It is less common than *retention*—the failure to expel that which is in the bladder. The latter may be referred to various causes. The bladder may be paralyzed, or the senses dulled, so that there is no desire to pass urine, even when the bladder is full, or there may be a nervous contraction of the urethra, resulting in an inability to do so even when the inclination is felt. When no urine has been passed for some time, if there is pain on pressure above the pubes, a dull instead of a clear sound on percussion, and if the outline of the bladder can be distinctly seen, it may be safely assumed to be full, and the use of the catheter is indicated. *Cystitis* is an inflammation of the bladder, marked by peculiarly distressing pain; it is often the result of taking cold, and is a frequent complication of uterine diseases. *Incontinence* of urine arises from weakness of the neck of the bladder, rendering it unable to restrain its contents; it is most frequent in children. Apparent incontinence may be really retention with overflow, caused by the over-distention of the bladder, and consequent muscular strain. Catheterization may be called for even when there is constant slight passage of urine. In all cases of incontinence special care is needed to keep the parts clean and to prevent excoriation, by frequent bathing and the application of ointments. Rubber urinals are sometimes used.

Whenever, from any cause, a patient is unable to

pass urine voluntarily, the catheter should be used every six or eight hours. If it is properly introduced, and no urine can be drawn, suppression may be inferred. This is a very serious symptom, for, if the system can not be relieved of its waste product, the urea is soon absorbed into the blood, and uræmia, a dangerous form of poisoning, results. Hot applications over the kidneys will sometimes excite them to action. So when the difficulty is retention only, hot applications over the bladder may relieve it; they usually will with children. A hot sponge between the thighs may be effective. The sound of running water will sometimes overcome retention due to nervousness. When the use of the catheter in the female is imperative, proceed as follows: Oil the instrument with the finger. Have the patient flat on the back, if possible, with the thighs slightly separated. Find the vagina as a landmark, and just above it will be felt a slight prominence. Immediately above this is the depression which marks the urethral opening. Into this slide very gently the point of the catheter, being careful that it does not slip into the vagina. It should not be pushed far enough to strike the walls of the bladder. As soon as the cavity is reached, the end of the catheter will move freely, and the urine will flow through it into the receptacle provided. If the flow ceases before a reasonable quantity has been passed, withdraw the instrument slightly, turn it, then push it a little farther in than before, when it may begin again. After the bladder is emptied, withdraw the catheter as gently as it was introduced. In no case use force. While removing the catheter, keep a finger over the open end, so that the few drops which it contains will not fall on the bed. If, from over-sensitiveness of the parts, the passage of the catheter causes great irritation, it may be allayed

by applying previously a little belladonna or cocaine ointment.

A distended bladder should not be too rapidly emptied by catheter, as there is danger of cystitis from the sudden collapse of its walls. When it is very full, draw only a portion of the contents at first introduction of the catheter, and repeat the process soon.

To pass the catheter skillfully is an important acquisition. It may, in most cases, be done entirely under the bed-clothes; no exposure of the patient's person is necessary, but there should be no hesitation in using the sense of sight when there is any difficulty in finding the meatus by touch. Do not even then expose the patient unnecessarily, but have the limbs flexed as she lies on her back, and cover each with a blanket, leaving only the vulva visible. In all cases of operation on the perinæum, vulva, vaginal walls, or urethra, the catheter must be introduced by sight, to avoid any possible damage to the stitches. This is also preferable after labor. Aseptic precautions are also necessary. The catheter should be boiled before use, and kept in a basin containing mercuric bichloride 1–3000. It is convenient also to have in this basin a number of cotton swabs. The parts should be washed carefully with the same solution, the labia being separated, and any wound receiving special attention. If the catheter should happen to slip into the vagina, remove, and wash it again before inserting in the urethra. When the urine has ceased to flow, the finger placed over the open end of the catheter and held firmly will prevent the urine escaping from the eye of the instrument as it is withdrawn. The urethral opening is now again sponged dry with one of the cotton swabs. The catheter is to be washed and replaced in the bichloride solution.

The flexible rubber catheter is the most convenient, and least likely to hurt the patient. No. 7 is a good size for ordinary cases. After each use it should be thoroughly cleaned and disinfected. Let a stream of water run through it in both directions, first from the eye downward, that any sediment may be driven down into the point. It may be boiled without injury, and soaked in bichloride. If kept in this solution, it should be rinsed before using. A glass catheter is preferred by many gynæcologists, and has the advantage of being most easily cleaned, and showing most readily the presence of any foreign matter.

In cases of cystitis, the bladder will often have to be washed out. For this purpose a double catheter or an especially designed syringe is used. Or it may be equally well done by fitting a longer rubber tube over one end of a piece of glass tubing, the other end being inserted into the ordinary catheter, which is then introduced in the usual way. Pour into the tube, through a funnel, the water, or whatever fluid is ordered, not more than two fluid ounces at a time. Lower the tube, and let it run off, and repeat the process until it runs clear. Never try to use a Davidson syringe for this purpose, as each impulse will give great pain.

CHAPTER XII.

The skin: its construction and function—Importance of keeping it clean—Bathing a patient—Changing clothes—The care of the teeth and hair—Hydrotherapy—Effects of cold water—Modes of using it—Warm and hot baths—Air and vapor baths—Medicated baths—Massage, friction, etc.

The skin is not only a protective covering for the body, but a complex excretory organ, doing as important a work in the elimination of waste products as the lungs and the kidneys. It consists of two distinct layers, the derma, cutis vera, or true skin, underneath; and the epidermis, cuticle, or scarf-skin, on the outside. The true skin is filled with blood-vessels and nerves; the cuticle contains none of these, but is connected with them by numbers of sudoriferous tubes. The surface of the body is closely covered with the openings of these tubes, known as pores. From these pores, water and excrementitious matters are constantly being thrown off in the form of vapor. By this steady evaporation the temperature of the body is regulated. If the body be covered with an impermeable coating, so as to entirely obstruct this process, death shortly ensues. The scarf-skin is continually scaling off and being renewed from beneath; at the same time, solid matters are to some extent deposited, as the water evaporates from the sweat-ducts. Besides these, there is another set of

glands in the skin, called the sebaceous glands, secreting a kind of oily matter, which serves to keep the skin soft and supple. The excess of this sebaceous matter, the cast-off scales of the cuticle, and the solid deposit from the perspiration, remain on the surface, and, unless removed, fill the pores and prevent further evaporation. Thus, even in a state of health, frequent and thorough ablution is a matter of the first hygienic import. Dirt of any kind blocks the mouths of the sweat-bearing tubes and impedes their action. This throws more work upon the other excretory organs, disturbing the balance of their functions, so that disease may often be traced simply to a failure to keep the pores of the skin open.

In sickness it is even more serious, for the exhalations of disease are morbid and dangerous, yet bathing is often neglected through fear that the patient will take cold. But cleanliness is a positive aid to recovery, and, with proper precautions, there are very few patients who can not be washed without danger. In almost all cases at least a sponge bath in bed can be given, care being taken neither to chill nor fatigue the patient. The bed should be protected by an extra rubber and draw-sheet. The room should be warm and free from draughts, and everything likely to be needed at hand—plenty of hot and cold water, soap, sponges, towels, clean clothing, etc. Take plenty of time, and, exposing only a small part of the body at a time, wash, dry and cover it before proceeding further. Use a sponge or a flannel wash-cloth. This will retain the heat much better than cotton. After the bath some light refreshment may be allowed, if the patient seems at all fatigued. A bath should never be given within two hours after a full meal.

The clothing should always be warmed before it is put on. To change a night-dress, or shirt, slip off the sleeves of the soiled one and pull it up toward the neck. Then put the arms in the clean sleeves, lift the patient's head and shoulders, and the soiled garment can be slipped off over the head with the same motion that puts on the clean one. Pull the latter down smoothly under the back, but not too tight. In this way the patient has only to be raised once. If he ought not to be lifted at all, the shirt or gown must be ripped all the way down the front. In taking it off, slip out one arm and put on the corresponding clean sleeve, work it under the shoulders, pushing the soiled one before it, and change the other sleeve. If two garments are worn, fit one inside the other before beginning, and put them on as one. Where there is an injured arm or side, begin with it in putting on a garment, but, in taking one off, begin always with the sound side.

The mouth should be often washed, and the teeth brushed, or wiped off with a bit of soft cloth. Water containing a few drops of tincture of myrrh, or of Condy's fluid, is good to rinse out the mouth. To remove sordes from the teeth, a mixture of lemon-juice, glycerin and ice-water, in equal parts, will be found efficacious.

In combing the hair begin at the ends, holding the hair firmly near the roots, to avoid pulling and to keep the head steady. It is best braided closely, or twisted on top of the head, so that the patient will not have to lie on a knot. When the hair is much matted, it is better to cut it short, though, with time and patience, very bad tangles can be straightened out. If the patient is in the hands of a good nurse from the commencement, it will never be allowed to get into such a condition.

To clean the hair a little aromatic spirit of ammonia in water is excellent, and it contains alcohol enough to make it dry quickly. If the hair is naturally dry, vaseline is a better dressing. Blood-clots in the hair, as after a scalp-wound, can be dissolved out by a solution of soda. In disinfecting after exposure to contagious diseases use a strong solution of boracic acid. The hair should be brushed, the teeth cleaned, and the hands and face washed at least once daily, the feet twice, and the whole body once every week. The nails should not be neglected. This applies to every patient.

Baths are used for remedial purposes as well as simply for cleanliness. They may be general or local, simple or medicated, cold, tepid, or hot; in the form of liquid, vapor, or air. Judiciously employed, baths are valuable therapeutic agents, but their unadvised use, as is true of all powerful remedies, may be hurtful rather than helpful. The exact temperature and duration of any bath ordered must be obtained from the doctor, and the effect upon the patient carefully noted. Tanner gives the following temperatures as to be understood when the definite degree of heat is not specified:

Cold........................	33°– 65° Fahr.
Cool........................	65°– 75°
Temperate....................	75°– 85°
Tepid........................	85°– 92°
Warm	92°– 98°
Hot	98°–112°

To put a feeble patient in a bath, wrap him in a sheet and lower it gently into the water. Have a warm, dry sheet ready to roll him in when he leaves the bath. Over this fold a blanket, and, putting him in a well-protected bed, leave him wrapped in them for a few minutes. In this way he will be made dry without extra

fatigue. A few long strokes with a soft towel will be all that is needed to complete the process when the wrappings are removed. If the bath is to be very soon repeated, it is better not to put on the clothes, but to leave the patient folded in a dry sheet, ready for the next plunge.

Cold baths are employed either to produce reaction, refrigeration, or nervous shock. Cold water abstracts the heat of the body, and affects the internal organs through the nervous system. Upon first entering a cold bath there is experienced a sense of chilliness and depression. The pulse is quickened, but the temperature of the surface is lowered, and the blood accumulates in the internal organs. A condition of reaction soon follows, with invigorated circulation, a feeling of warmth and exhilaration; but if the immersion be too long continued the coldness returns, with weakness of the pulse and general depression. A cold bath should not be given when the patient feels chilly, when there is free perspiration, any visceral inflammation or tendency to congestion of the internal organs, or during menstruation. If shivering comes on during the bath, the patient should be at once taken out and put to bed, heat applied, and stimulants given if it persists. The cold bath is sometimes used as a tonic in cases of debility, but there must be a certain amount of vigor to render it endurable. It is best taken in the morning, and followed by vigorous rubbing and gentle exercise. The head must be first submerged, and the bath continued only long enough for the reactionary stage to be reached —not more than five minutes. The colder the water, the sooner reaction takes place. A cold sponge-bath can be taken with much less danger of chill if one stand with the feet in warm water. The cold bath is a most

speedy and effective way of bringing down a high temperature. It may be lowered from one to six degrees. The shock of sudden immersion in cold water may be avoided by beginning with a tepid bath, and gradually reducing it as much as desired by adding cold water or ice. The temperature must be taken by rectum and the patient removed from the bath before it is lowered to the required point, for it will continue to fall for some little time afterward, until the heat of the interior and exterior of the body becomes equalized.

A more convenient way than plunge baths of applying cold water for the reduction of temperature is by means of a fever-cot. This is a frame covered with sacking, below which a rubber cloth is hung, one end lower than the other. The patient, wrapped in a sheet, lies on the sacking, and has buckets of cold water poured over him at stated intervals. The water runs through into the rubber trough, which conducts it into a pail at the foot of the cot.

Another mode is by the wet pack or envelope bath. To prepare for this, first put three or four blankets on the bed, and over these a sheet wrung out in hot or cold water, as ordered. Lay the patient on this, and fold the sheet over him, tucking it in well on both sides from the neck to the ankles, the feet not included. The blankets are then to be folded over him, one by one, in the same way, and the patient left in them from thirty minutes to three hours. Give plenty to drink, and keep the feet warm. This treatment is usually very comfortable to the patient, and he will often fall asleep while in the pack. It will render the skin moist, subdue restlessness and delirium, and reduce fever. Upon removal, dry off the patient quickly and wrap in a warm dry blanket for some hours. If the object is simply to

reduce temperature, the sheet wrung out in cold water may be employed, without the superimposed blankets, and changed every ten or fifteen minutes. The same effect may be more easily produced by applying towels wrung out in ice-water, dry enough not to drip, one after another, from the neck downward. When the feet are reached, begin again at the head, and renew each in succession, continuing as long as necessary.

Cold or tepid sponging often gives much relief to a feverish condition. Sponge always downward, and wrap the patient, still wet, in a warm blanket, leaving him undisturbed for an hour or two. Alcohol in the water makes it more cooling by its rapid evaporation. Alcohol alone may be used for sponging, after which do not wipe the patient dry.

If it is desired to produce a shock upon the nervous system, as sometimes when there is disease of the brain or nerves, affusion is employed. This is simply throwing cold water upon the body. The shower bath is one form of it, and the douche another. The latter is most used as a local tonic. The stream should be directed from a height not exceeding ten feet, and, if the affected part is very weak or sensitive, should first be brought to bear upon the surrounding portions, and only by degrees immediately upon it. A douche of hot and cold water alternately is often advised.

A general warm bath is used to induce perspiration, soothe pain, or relax spasm. The effect of warm or hot water is at first agreeable. Transpiration is increased through both lungs and skin, and the circulation accelerated. A very hot bath excites and stimulates the nervous system, while tepid or warm water rather calms and soothes it. If the water is too hot, or the bath too long continued, languor, giddiness, or faintness may super-

vene. The temperature should be tested with a thermometer, and the same degree of heat kept up throughout. Care must be taken that no part of the body comes directly under the hot-water tap. Keep the head out, and cool. An invalid should never be left alone in the water, and must be taken out of it at once if any sign of faintness appears. A hot bath will not be given during the menstrual period, or in the last stages of pregnancy. Some surgical cases have been successfully treated by long-continued immersion of the injured part in hot water. For this purpose, especially constructed tubs are provided Immersion in water as hot as can be borne is said to be useful for sprains in their earliest stage.

A foot-bath is usually given to relieve the head, and should be as hot as possible. If the patient is able to sit in a chair, see that he is warmly wrapped up, and cover both patient and tub with a blanket. Let the water come nearly to the knees. Adding mustard will increase the effect. The bath can be given in bed, if necessary, though less conveniently. Have it well protected, turn up the clothes from the foot of the bed, direct the patient to lie on the back and bend the knees, when the feet can be set in a foot-tub or a deep bowl of water. Have it well balanced, cover with a blanket, and let the feet soak from a quarter to half an hour. Then dry them well, and either wrap in flannel or put on woolen stockings. The same treatment will be found useful for cold feet.

For a sitz or hip bath, the patient is immersed from the knees to the waist and covered with blankets. The temperature of the water must be well kept up, and the bath prolonged about twenty minutes. The object being to excite the menstrual flow, the bath should be given, as nearly as can be calculated, at the time

when that would naturally appear. The hot foot-bath is sometimes employed for the same purpose. Neither should be given when there is any suspicion of pregnancy.

For a hot-air bath, an alcohol lamp and a body-cradle are required. The sheets and the patient's clothing are taken off, blankets enough put over the cradle to render it nearly air-tight, and snugly tucked in. The heated air should enter on a level above the patient, whose body should be sponged with tepid water until there is free perspiration. The lamp may be kept burning for twenty minutes or half an hour, and the patient then sponged off with cool water. A vapor bath may be given with a similar apparatus, or by conducting steam under the cradle from the spout of a boiling tea-kettle. Still another way is by wrapping hot bricks in wet flannel, and setting them on earthen dishes under the cradle.

Both the hot-air and vapor baths may in less severe cases be given in a cane-bottomed chair, constituting a modified Turkish bath. Let the patient, entirely without clothing, sit on a wicker chair, with the feet on a stool. Cover with several blankets, and under the chair burn a spirit-lamp with a large wick. Let the patient drink freely, and, after he has perspired sufficiently, put him in a general bath of 75° or 80°, or pour over him a pail of cold water. Dry thoroughly, and keep him warm afterward.

Both liquid and vapor baths may be medicated. A mercurial vapor-bath is given like the above, but with a special apparatus for the evaporation of calomel. This, after being deposited upon the skin, is not to be rubbed off. An acid vapor may be produced by evaporating vinegar.

For an alkaline bath, add half a pound of carbonate of soda to fifteen gallons of hot water.

A sulphur bath is prepared by adding to each gallon of water twenty grains of sulphuret of potassium. This must be given in a wooden or porcelain-lined vessel, as the sulphides discolor most metals. This is ordered sometimes for rheumatic affections, and sometimes for disease of the skin—in the latter case not usually until the subsidence of the acute stage, as it tends rather to aggravate the rash. With all skin diseases, rain water should be used, or hard water softened by the addition of soda, bran, starch, or gelatin. The skin should not be rubbed, but dabbed dry with soft towels.

For a bran bath, boil a pound of bran in a bag for a quarter of an hour, drain off the fluid, and add it to the bath.

For a starch bath, take half a pound of starch, and mix it with two quarts of water before adding it to the bath.

A salt bath is usually given cold for tonic effect. Either sea-water may be used, or a solution of rock-salt in the proportion of one pound to four gallons of water.

After any emollient or soothing bath, the patient should be kept quiet; after a stimulating bath, energetic friction and exercise are in order.

MASSAGE.

Massage is, in the hands of a skilled operator, a valuable mode of treatment, though it has been somewhat in disrepute, from having been allowed to fall largely into the hands of charlatans, so-called "magnetic mediums," and others of that ilk whose pretensions have degraded everything associated with them. But it is deserving of rescue, and, as reputable physicians

are taking it up and using it appropriately, it is gaining ground in scientific estimation. Massage will, to a considerable extent, take the place of active exercise, keeping the muscles strong and supple. It develops heat at the points of contact, so elevating the general temperature and dilating the vascular system. It furthers absorption, accelerating the motion of the blood currents, removing effete matters, and so promoting nutrition. It has usually a powerfully sedative effect upon the nerves, though in some instances it will be found to excite rather than to soothe. Insomnia and neuralgia can often be relieved by it, and spinal irritation to some extent controlled. In the treatment of nervous disorders it is often combined with rest, rigid dietetics, and electrical excitation. Perhaps the most conspicuously good results are in cases of chronic joint affections and thickening from inflammatory deposits.

Massage consists of a peculiar kneading of the underlying muscles, and is quite distinct from friction and percussion, which touch only the external tissues, but it is often combined with them, and with the "Swedish movements," active, passive, resistive, or assistive. The word, as commonly used, may be understood to embrace all forms of manipulation.

A few desultory lessons will not qualify you to give or teach massage. It takes time, patience, and a great deal of strength to acquire the art, and constant practice to retain any facility in it; for, even when once gained, it is soon lost by disuse. Mere rubbing may be agreeable and useful, but it is not massage.

Theoretical instruction does not amount to much on such a subject, and there are many variations in vogue even among good masseurs, so that the most that can

be attempted here is to give a few of the points in which the most rational operators agree, and which experience has shown to be valuable. It is very hard work always—too hard to combine with nursing—but a skilled manipulator will accomplish more in less time, and with less effort, than an inexperienced one. The whole body can be gone over pretty thoroughly in an hour, after which a general rise of temperature of about one degree may be looked for.

The hands need to be at once strong and soft, the motions smooth and even, never jerky. The work should be done from the wrists, not from the shoulders, and you want equal flexibility and freedom of action in both hands. All movements should be begun slowly and gently, and their force and frequence gradually increased. A very tender spot can be barely touched at first, but after a little skillful handling an amount of force can be employed which would have seemed incredible. The whole hand, not merely the ends of the fingers, should be used. In malaxation or massage proper—manipulation of the deeper tissues—the work is chiefly performed by the ball of the thumb and the palm of the hand. Each muscle is kneaded and rolled with carefully graded force. Begin at the extremities and work toward the trunk. If the feet are cold, keep at them until they are quite warm before going on. Take up each group of muscles systematically, compress, rotate, and relax, advancing by degrees, that each handful may include part of what has been previously treated. Never stretch the tissues in opposite directions at the same time. Muscles should be stretched in the direction from their insertion to their origin, from extremities toward the trunk, on the back from the base of the skull downward, and away from the

spinal column. On the chest, follow the pectoral muscles in the same way, and on the abdomen knead steadily and firmly the ascending, transverse, and descending colon. Massage of the abdomen often relieves dyspepsia and constipation.

Friction should act only upon the skin. If counter-irritation is desired, a coarse towel or a brush is better than the hand. Friction may be vertical, transverse, or spiral. Rectilinear friction should be toward the center of circulation, to assist the venous currents. Thus, on a limb, the heaviest strokes should be upward, the returning ones much lighter. Friction circularly, or at right angles to the long axis, though sometimes practiced, is awkward and of little use. What may be done by such motions can be accomplished more effectively by vertical and spiral movements. In the latter, both hands are used at once—one ascending as the other descends. On the limbs, friction may be applied at the rate of one to five hundred strokes per minute; on the body and thighs the pressure must be greater, and the strokes longer, so that they can not be as rapid. Malaxation and friction may be used in alternation. Take a small portion of the body at a time, as the space between one joint and another, and manipulate it thoroughly before passing to the next. With them may be combined also percussion over masses of muscle and the various passive, assistive, and resistive motions.

Passive motions are conducted without any effort on the part of the patient. When there is partial control of the muscular action, the operator either helps or tries to hinder the efforts of the patient, being careful not to overtax his little strength, and the exercises are then known as assistive or resistive. Such movements are applied, together with massage, to strengthen weakened

muscles and break up adhesions in diseased or anchylosed joints. It is of importance to know something of their anatomical structure and the limits of natural motion.

What is known as the Roman bath is massage with inunction. When there is a dry and insufficiently nourished skin, inunction may be useful; but it is not an essential part of treatment by massage, though unskilled manipulators often use oil of some kind on their hands to avoid chafing the skin.

The "lomi-lomi" of the Sandwich Islanders is a crude kind of massage.

CHAPTER XIII.

Infectious diseases—Modes of propagation—Disinfectants—The care of a contagious case—How to keep the air pure—To prevent the spread of disease—The care of the dead—Final disinfection and fumigation.

Among the responsibilities which have been mentioned as pertaining to the nurse, there is none of greater gravity than the prevention of contagion. It is now an accepted fact that the atmosphere is everywhere more or less laden with the minute organisms known as bacteria or microbes. These are the lowest forms of animal life. They are complex though microscopic, and capable of very rapid multiplication. One class of them produces inflammation and suppuration in a wound. These will be further considered when we take up the subject of surgical nursing. Their chief function is to disintegrate and destroy dead animal and vegetable matter. In the course of their work, certain poisonous juices are produced, called ptomaines or animal alkaloids. Microbes are not all of an infectious nature, but among them are the germs of various diseases.

All infectious diseases are supposed to be propagated by the agency of such living particles, given off from the body of the sick, and conveying the specific poison. They may lie dormant for a time, but under suitable

conditions develop and multiply, reproducing the original disease. In some cases the conditions of development are found within the body, and the disease can be directly transmitted from one person to another, while in others the germ only originates in the body, and requires to be developed outside before it becomes infectious. Of the latter class are typhoid, yellow fever, cholera, dysentery, and the plague, while all the other diseases commonly recognized as infectious are capable of direct transmission.

After exposure to contagion, some time is required for the development of the infectious germs before they actively manifest themselves. This interval, during which the poison remains latent, is known as the period of incubation. It varies in different diseases, and even in different cases of the same disease, though each has its own characteristic type and mode of development. Small-pox is contagious even during the period of incubation. In measles and whooping-cough, the risk of infection is greatest early in the disease, before the appearance of the specific symptoms, rash and whoop. Scarlet fever is not infectious before the throat symptoms are present, and is most dangerously so during the third and fourth weeks, when the skin is peeling. The poison of typhus appears to exert its influence only within a limited range; contact with the patient must be moderately close for infection to take place. But the germs of small-pox or scarlatina may be carried about indefinitely, or lie hidden in a room or in clothes for months, and then under suitable conditions manifest the greatest virulence.

Diseases which attack many people at the same time are termed epidemic; those confined to particular localities are endemic. Sporadic cases are such as occur

singly, and independently of any recognized infectious influence.

Disinfectants are such substances as act upon the specific contagia of communicable disease, and destroy them, or render them inert. They are to be carefully distinguished from antiseptics, preventives of decomposition, and from deodorants, which merely subdue disagreeable smells. Some of the latter may be useful in absorbing deleterious gases, but they have no effect upon the solid particles which convey contagion.

Abundant oxygen is the best disinfectant; it decomposes the septic germs, as it does all other animal organisms. Boiling for half an hour will destroy the activity of all known disease germs, though in some cases their spores have a greater resisting power. It is believed, however, that exposure to steam at a temperature of 230° F. will be fatal to these also. Dry heat is less effective than moist, therefore steaming is surer than baking.

Whenever any directly communicable disease is found to exist, the first thing to be done is to isolate, as completely as possible, the patient and his attendants. There should be two nurses for every such case, that each may get the daily open-air exercise which is more than ever important, and neither be obliged to sleep in the infected room. They should avoid contact with all outsiders as much as possible, and always change their clothes upon going out. The hair, which can not be changed, should be covered with a close cap. Nothing should be worn in the room which may not afterward be washed or destroyed.

The directions given for the arrangement of a sick-room apply with the greatest force in these cases. All superfluous things, particularly such as can not be washed,

must be taken out of the room before the patient is put in it. After he is once quarantined, every article carried out of the room must be disinfected. A set of dishes should be kept for his exclusive use, and washed by the nurse. The bedding, clothing, etc., must not be sent to the general laundry, but washed by themselves after being well soaked in some disinfecting solution. For any minor dressings, and in the place of handkerchiefs when there is a discharge from the throat or nose, use old soft cloths that can be immediately burned. All excrementitious and vomited matter must be disinfected with the greatest care.

There is nothing small enough to be careless about. Even the broom which sweeps the floor should not be used again elsewhere. Do not let the air blow from the sick-room into the rest of the house any more than can not be avoided. It helps to keep the air pure to hang about the room cloths kept wet with some disinfectant. Over the doorway may be hung a sheet similarly dampened. This has at least an excellent moral effect, and moral influences are not without value in dealing with contagion. While neglecting no possible precaution, try not to create unnecessary alarm. People afraid of infection are predisposed to it by acquiring a nervous condition which renders them doubly susceptible. Yet the danger is not to be underrated, and insufficient precautions may actually be worse than none, giving an unfounded sense of security.

Take good care of yourself as well as your patient, for the confinement and the isolation make these cases doubly wearing. Try to secure rest and nourishing food at regular hours, and do not let the trouble of having to change your clothes hinder you from getting out of doors every day, even if you are tired. A brisk

walk in the fresh air is the best possible disinfectant for yourself.

So, also, the best way of disinfecting the air of the sick-room is by exchanging it for pure air. Air can not be renewed by disinfecting it, any more than it can be disinfected by deodorizing. Neither process renders it fit to breathe again. In all cases of infectious disease free ventilation is of the first importance. In those diseases in which, as in scarlet-fever and small-pox, the infectious particles are largely thrown off by the skin, a good deal can be done toward keeping the air pure by inunction of the skin with carbolized ointment, and by frequent bathing and changing of the clothes.

The burning of pastilles, cascarilla bark, etc., serves rather to add to than to remove the impurities of the air. Charcoal or peat, placed about the room in shallow pans, does absorb a certain amount of poisonous matter. Carbolic crystals exposed in an open dish, or a carbolic solution sprinkled about the room and on the screens and outer covers of the bed, will quickly correct any offensive odor; but neither of these is to be regarded as a disinfectant. Solutions of sulphate of iron, nitrate of lead, and permanganate of potash, and the various chlorides of lime, soda, and zinc, similarly used, do act as true disinfectants, the former gradually giving off oxygen and the latter absorbing carbonic-acid gas and liberating chlorine; but as they affect only the air coming in contact with them their influence is not far-reaching. The vapors of iodine and bromine and the fumes of nitrous acid have vigorous disinfecting qualities, but, as commonly employed, they are only deodorants, as they can not be used in the sick-room in quantity enough to be useful without exciting dangerous bronchitis. Indeed, any gaseous dis-

infectant, to be effective, must be used in quantity incompatible with human presence. Chlorine and sulphurous-acid gas are the only two commonly employed.

The most powerful and rapid of the liquid disinfectants in general use is the solution of bichloride of mercury (corrosive sublimate). It is also a valuable antiseptic. The solution ordinarily used is of the strength of 1 to 1,000, about fifteen grains to the quart. This may be used for disinfecting vessels, sinks, and drains; but not for clothing, as it makes an indelible stain. For the latter purpose may be used a solution of sulphate of zinc and common salt, four ounces of the sulphate and two of the salt to a gallon of hot water. Soak the clothes in this for two hours, and then boil them with soda or borax. Dry in fresh air.

Condy's fluid (solution of permanganate of potash) is often recommended, but it can hardly be used strong enough to do any good without staining. The sulphate of iron (copperas) should remove such stains, but itself discolors. Stains from copperas can be taken out by oxalic acid or lemon juice. Carbolic also decomposes Condy's fluid, and is incompatible with chlorine, so that it must not be used in combination with either of them. Chlorine and sulphurous acid mutually destroy each other. Chlorine is soluble in water to the extent of two and a half volumes; the solution can be used as a disinfectant for clothing, etc. It is decomposed by the action of light.

Copperas or chloride of lime may be thrown dry into water-closets and drains with good effect. They should afterward be thoroughly flushed. A little disinfectant should be kept standing in all sputa-cups, urinals, and bed-pans, ready for use. For this purpose the tincture of iodine, or Condy's fluid, is excellent. The latter may

be known to have lost its efficiency when it has lost its color.

A good disinfectant is made by dissolving half a drachm of nitrate of lead in a pint of boiling water, then dissolve two drachms of common salt in eight or ten quarts of water. When both are thoroughly dissolved, pour the two mixtures together, and when the sediment has settled you have a pail of clear fluid, which is the saturated solution of the chloride of lead. A cloth saturated with the liquid and hung up in a room will at once sweeten a fetid atmosphere; poured down a sink, water-closet, or drain, or on any decaying or offensive object, it will produce the same result. The nitrate of lead is very cheap, and a pound of it would make several barrels of the disinfectant.

With disease which is only indirectly infectious—as typhoid and cholera—isolation of the patient is not necessary; but the greatest care is essential in disinfecting those discharges from the body which contain the germs of contagion. All excrementitious matter must be disinfected and disposed of thoroughly and promptly. For stools, cover the bottom of the receiving vessel with a layer of copperas or chloride of lime before use. After use, add crude hydrochloric or sulphuric acid, in quantity equal to half the bulk of the discharge, cover closely, and carry at once from the room. These stools must not be emptied into the common closet. The best way to dispose of them is to mix with sawdust and burn them. All clothing and bedding soiled even in the slightest degree with the discharges must be disinfected with equal care and boiled. These measures, rigidly taken, will prevent the spread of such disease, unless there is some local cause for it.

When a patient has died from any infectious dis-

ease the body should be washed with some disinfectant. Labarraque's solution is commonly used. The burial should be as soon as possible, and strictly private.

After a case is ended, whether by death or recovery, the room must be subjected to a thorough process of cleaning and fumigation. Everything that can be so treated should be boiled, or baked in a disinfecting oven, at a temperature of not less than 220° F. The floor, woodwork, and, if possible, the walls, should be scrubbed with some disinfectant, the mattresses taken to pieces for fumigation, and the bedding washed. Rubber sheets and aprons are best cleaned with Labarraque's solution; they, of course, can not be baked. Everything that can not be otherwise thoroughly disinfected should be hung up in the room while it is being fumigated. All drawers and closets should be left wide open, that the gas may penetrate to every corner. Either sulphurous-acid gas or chlorine may be used for fumigation; the former is usually perferred. They are both powerful bleaching agents, and will discolor metals, so that all metallic surfaces should be first covered with a coating of grease to protect them.

To fumigate a room or ward with sulphur, close the doors, windows, and fireplace, and paste paper closely over all the cracks. Put the sulphur in iron pans, allowing two pounds for every thousand cubic feet of space. Set the pans in larger pans of water, and these on bricks so as not to burn the floor; pour a little alcohol over the sulphur and ignite, beginning with the pan farthest from the door by which you are to make your exit. Leave the room quickly, and paste up this door like the others. Keep it closed for twenty-four hours; then open all the windows, and let the room air for as much longer.

When chlorine is used, the same precautions must be taken against its escape. The materials for its production are better placed in the higher parts of the room than on the floor, as the gas is heavier than air. The following is the best way to procure it in quantity: Mix a pound each of common salt and the black oxide of manganese in a shallow earthen dish, add two pints of sulphuric acid previously diluted with two pints of water, and stir with a stick. Chlorine is irrespirable. If it becomes necessary to enter a room full of it, hold near the nostrils a handkerchief wet with dilute ammonia, but, when possible, the windows should be left so that they can be opened from the outside.

The efficiency of both sulphur and chlorine is increased by the presence of steam; the latter especially requires a certain amount of moisture in the air. It is now said that the value of sulphur as a disinfectant has been greatly exaggerated, but nothing better has been suggested to take its place. Disinfection and antisepsis will be more fully treated later in their relations to surgery.

CHAPTER XIV.

Surgical cases—Wounds of various kinds—Their modes of healing — Inflammation — Blood-poisoning — The treatment of wounds—Surgical dressings—Dangers to be anticipated.

Wounds of all kinds, with the diseases resulting from them, and such others as are treated by operative or mechanical means, come under the head of surgical cases. A wound is defined as a solution of continuity of the soft parts. It may be of any degree of severity, from a slight contusion to an extensive laceration.

An incised wound is a simple smooth cut, like that of a knife, and is dangerous in proportion to its depth. If the edges are torn, the wound is described as lacerated. A lacerated cut will be more painful than a sharp incision of the same extent, but the hæmorrhage will be more easily controlled. A contusion or bruise is a subcutaneous laceration. It will occasion more or less extravasation of blood, known as ecchymosis. If the contusion is accompanied by a rupture of the integument, the discoloration will be less, as the effused blood and serum find an outlet. This constitutes a contused wound. It is usually made by some blunt instrument. The tissues may be crushed beyond recovery, in which case ulceration sets up around the dead parts, and they become gradually separated. Such separation is known as

sloughing. All lacerations partake of the character of contused wounds, as there is more or less bruising about the sides and edges. Gunshot wounds, being made by blunt bodies, are practically tubular contused wounds. They are very painful, and likely to be accompanied by a deep-seated inflammation, as they usually contain foreign matter. Punctured wounds are those made by sharp-pointed instruments. If of any depth, they are dangerous, from the variety of tissues involved, and from the want of a free vent for any discharge that may be set up. Slight wounds may be rendered more serious by the introduction into them, either at or after the time of injury, of some poison or virus.

Burns are dangerous in proportion not so much to their depth as to the extent of surface involved. A burn covering half the surface of the body will result in death from shock; recovery is very rare if so much as one third of it is burned. Burns are sometimes classified as of three degrees: The first is a mere reddening, with slight swelling, owing to distention of the capillary blood-vessels. It is sometimes followed by desquamation of the cuticle. If the heat applied has been a little greater there will be a rapid flow of fluid out of the distended capillaries, and blisters will be formed containing serum, or serum mixed with blood. These may be raised immediately, or after a few hours. With a burn of the third degree the injury is still more severe, so as to destroy the vitality of the part. The gangrenous portion then gradually sloughs off, with free formation of pus, and the wound heals slowly by granulation. The cicatrix of a burn has a strong disposition to contract, and often produces great deformity. Severe burns are not infrequently complicated by inflammatory affections of the internal organs. The lungs

and kidneys often become deranged in their action, and gastric disorders are common. Perforating ulcer of the duodenum occurs seldom earlier than the tenth day after injury.

Scalds are, in effect, similar to burns, and frost-bites are analogous. Of the latter there are two degrees: one in which vitality is merely suspended, the parts being white, stiff, and numb, and developing an inflammatory tendency upon return of the circulation; and a second degree, in which the vitality is completely destroyed, and gangrene supervenes upon thawing.

There are five modes described, by either of which a wound of the soft tissues may heal. 1. By *primary union*, where two cleanly cut surfaces, brought into close contact, simply grow together, without suppuration. This is also called healing by first intention. Wounds of the perinæum and of the face and throat are most likely to heal in this manner. 2. When union by first intention does not take place, there may still be *primary adhesion*. A layer of lymph exudes, gluing together the surfaces of the wound, which then unite promptly. 3. In the process of *granulation*, the wound is gradually filled up to the surrounding level by new tissues, appearing in the form of small, red, close-set granules bathed in pus. 4. In *secondary adhesion*, two granulating surfaces, brought together, unite. 5. *Under a scab*, where the effusion of lymph forms a thick film, under which the healing process goes on, the surface of the sore contracting and acquiring a new skin. It takes a cicatrix a long time to acquire the vitality of the original structure, if, indeed, it ever does.

For ordinary purposes it is, perhaps, sufficient to classify wounds as healing by first intention or by granulation, without going further into detail. Destruction

of the external tissues, attended by secretion of pus, is ulceration.

Granulations, if deficient, can be encouraged by stimulating applications, or be checked, if excessive, by astringents. Nitrate of silver is most often used for the latter purpose.

The healing of a granulating surface may be hastened by skin-grafting, which consists in placing upon it small portions of skin freshly cut from some part of the patient's or some other individual's body. If the operation is successful, each graft becomes a center around which cicatrization takes place, thus rapidly diminishing the size of the ulcer. The resulting cicatrix possesses more vitality, and is less liable to contract, than that which results from the ordinary healing process. In deep ulcers, prepared sponge is sometimes used for grafting. This is invaded by the granulations, and is subsequently absorbed. Antiseptic precautions must be taken in grafting.

The healing process is often hindered by inflammation, a series of changes in the blood and the tissues resulting from irritation or specific poison, and manifested by heat, redness, swelling, pain, and suppuration. The swelling will be greatest and the pain least where there is the most loose tissue; in a bony or fibrous tissue inflammatory pain is very severe. Inflammation attacking a mucous membrane is of less importance than when a serous membrane or solid part is affected, as the matter can find its way to the surface by one of the natural outlets; otherwise it is pent up in a cavity, or in the substance of some organ. An accumulation of pus in any of the tissues or organs of the body is an abscess. In opening an abscess a free incision should always be made at the lowest point. The common but

reprehensible plan of making a small opening and forcibly squeezing out the contents of an abscess has been aptly termed "surgical barbarism" (Gerster). If it is left to break spontaneously, the resulting scar will be larger than if it is cut. When the pus manifests a tendency to work toward the surface, it is said to be "pointing." No wound should ever be allowed to heal at the surface first, as there will then be no outlet for the imprisoned matter, and it will "burrow" inwardly, doing further injury. Drainage tubes are sometimes used to keep wounds open until they heal from the bottom, and to carry off the pus. They are most often of rubber or glass, with holes in the sides, so that the pus may flow in from every direction. Strips of iodoform gauze are used for the same purpose.

Healthy or "laudable" pus is a thick, cream-colored, opaque discharge, smooth, slightly glutinous, and insoluble in water. The formation of pus is accompanied by pain and throbbing, and, if extensive, with fever, and sometimes chills or rigors. It is a steady drain upon the system, and a patient suffering from a suppurating wound needs to have his strength kept up by the most nourishing food.

Foreign matters in a wound, or retained and re-absorbed secretions, may give rise to general inflammatory fever. To prevent the retention and consequent decomposition of discharges, and to protect from external contamination, are the main points of the local hygiene of surgery.

The treatment of wounds consists in checking the hæmorrhage, removing foreign matters, bringing separated surfaces into apposition, and excluding the air by some aseptic dressing. Decomposed animal matter is one of the most virulent of poisons, and the smallest

particle of it carried from one case to another may suffice to set up inflammatory action. Great care is needed to guard against this in a surgical ward. Two bad cases should not be put in adjoining beds, when it can by any possibility be avoided, and the proportion of suppurating wounds in the ward ought not to exceed one third. All instruments—scissors, forceps, etc.—used about the dressing, even of a healthy wound, must be thoroughly cleaned before they are put away or used again. If oil or vaseline is required, do not allow fingers to be put into the common bottle, but take out a little, and throw away all that is left of it. The dressings taken from a wound must never be carried around from one bed to another, but removed from the room at once. Those which have been next the wound should be burned, not washed, and such as are to be washed must be first disinfected. Avoid soiling your own hands with dressings. Always have a basin in which to carry away the old ones, and do not use fingers where forceps will do as well. Do not go from one case to another without washing the hands in a disinfecting solution. Protect with a bit of plaster any place where the skin is broken, for you may get badly poisoned yourself through a slight scratch. If you find such a slight wound in washing your hands, pour a few drops of glacial acetic acid on the spot. It will bite, but it is a good preventive. Too much emphasis can not be laid upon the necessity for absolute cleanliness in every way. Cleanliness, in its broadest sense, is the best antiseptic; certainly, none can take the place of it. Clean hands, and especially finger-nails, are of literally vital importance. The organic matter which finds lodgment under the nails is in the highest degree dangerous, and has undoubtedly been the source of many cases of blood-poisoning. With suffi-

cient care, however, an almost absolute immunity from sepsis can be secured. It is now comparatively rare, and its occurrence always reflects severely upon either surgeon or nurse.

Before beginning a surgical dressing it is important to have at hand everything likely to be needed: it is awkward for yourself and fatiguing to the patient when you have to leave in the midst of the process to find something that has been forgotten. Of course, when the doctor is to do the dressing you can not always tell just what he will call for, but the things that you know will be wanting should always be ready; and after you have seen a dressing once you should certainly know how to prepare for it again. A protector for the bed is wanted in every case, as also are towels, scissors, pins, and basins. Of these last mentioned there should be three—one to receive the discarded dressings, one containing fluid to wash the wound, and one to hold under it to catch the discharges. For the latter purpose the crescent-shaped basins are most convenient, as they fit closely to any part of the body.

Old dressings should never be pulled off forcibly. If they stick to the wound, they should be irrigated until wet enough to come off easily. In removing adhesive plaster, take hold of both ends and make traction toward the wound from both directions evenly. It may be well to apply new strips of plaster between the old ones before taking them off, so that the wound can not be pulled open. Alcohol, ether, or turpentine will remove the traces of plaster. If obliged to leave a wound undressed, cover it with a *guard*—a piece of gauze or muslin saturated with the antiseptic used. Drain off the fluid from the soiled dressings before throwing them into the waste-pail, and take care that no instruments

go in with them. Before fresh dressings are applied the wound must be washed with some antiseptic solution. Do not rub, but irrigate very gently until it is quite clean. It will seldom be necessary even to touch it. Dry around the edges with the softest lint. Very extensive wounds, as severe burns, are best dressed only a part at a time. Dry or absorbent dressings are now largely used, as moisture is found to promote the development of germs. The practice of surgery has been revolutionized since the development of the germ theory. The destruction of infectious germs or the prevention of their multiplication is the one end and aim of the antiseptic treatment of to-day. The exclusion of these micro-organisms constitutes asepsis. Antiseptics hinder their development and arrest decomposition, but do not necessarily destroy their vitality. True disinfection is only secured by germicides. Freshly boiled water cooled in covered vessels is now much used for washing or irrigating wounds, and by many surgeons all dressings are sterilized by heat. If this can be thoroughly done no chemical disinfectants are necessary, but a considerable variety of these are still in use. By far the most reliable is the bichloride of mercury, or corrosive sublimate. Carbolic acid is largely employed, and ranks next in value. Among numerous others of more or less efficiency are salicyic and boric acids, the biniodide of mercury, creolin, iodine, iodoform, thymol, and the various chlorides of lime, soda, zinc, etc.

It is useless to give full directions for different dressings, as each operator has his own methods, and new ones are continually coming in vogue; but every nurse needs to be familiar at least with the two first-named and most commonly used germicides, to understand how to manipulate and prepare them for use.

Bichloride of mercury comes in the form of a coarse white powder, and is soluble in boiling water or alcohol. It is commonly used in aqueous solution, of strength varying from 1 part in 1,000 to 1 in 5,000. To prepare the 1-1,000 solution, dissolve thirty grains of the powder, accurately weighed, in three and a half pints of boiling water; unless it is to be used immediately add also thirty grains of common salt. Otherwise it is likely to decompose and degenerate into calomel (the mild chloride of mercury), which has no value as a disinfectant. This is the strongest solution used in surgery, and can be diluted to any required degree. The bichloride solutions have a corrosive effect upon metals, so that they can not be used for the disinfection of instruments, nor must they be poured into any metallic vessel. Gauze, bandages, and other materials for dressings are rendered aseptic by impregnation with corrosive sublimate after prescribed methods.

Carbolic acid, when pure, comes in transparent crystals. In this form it is a powerful caustic. The strongest aqueous solution ordinarily used is one part in twenty. To prepare this, set the bottle containing the crystals in hot water until they liquefy. Pour out carefully one fluid ounce and add nineteen of boiling water. Shake vigorously until the acid is in perfect solution. If any floating particles are left undissolved they will retain all the caustic quality of the crystals. A solution of carbolic acid in olive oil or glycerin (1–10 to 1–20) is sometimes used. Carbolic solutions and all carbolized dressings should be kept in air-tight receptacles, as it volatilizes readily and so loses strength. Both corrosive sublimate and carbolic acid can now be procured in compressed tablets—a very convenient form, and one which insures accuracy of measurement. They are both

powerful poisons, and must be handled with great care. Enough may be absorbed from the dressing of a wound to produce toxic symptoms, and the nurse should always be on the lookout for constitutional effects when any powerful drug is used as an antiseptic. Where carbolic acid is employed the urine should be carefully observed, as one of the earliest symptoms of poisoning by it is a dark-green color of that excretion. Headache, giddiness, and nausea not otherwise accounted for are suspicious indications; great depression of the vital powers, with low temperature and collapse, may follow. Poisoning from the external use of corrosive sublimate is marked by the same symptoms as when a mercurial is taken internally—vomiting and purging, with abdominal and muscular pains, rapid failure of strength, collapse and death, if the cause is not removed.

Dangerous constitutional effects have been known to result from the absorption of iodoform through a wound. Such cases are marked by great depression, with headache, loss of appetite, a continual taste of iodoform in the mouth, cerebral disturbances, and symptoms otherwise like those of carbolic-acid poisoning.

Creolin is a new germicide said to be as powerful in its action as carbolic acid, and not poisonous, so that for many purposes it is to be recommended. It is used in a two-per-cent solution, that is, ℨ ijss–Oj.

Among the materials most frequently used for surgical dressing are the *bichloride gauze*, already mentioned; *carbolized gauze*, a similar preparation of unbleached tarlatan or cheese cloth saturated with a mixture of carbolic acid, alcohol, resin, and paraffin; *absorbent cotton*, cotton wool from which all the oil has been extracted, often charged with some antiseptic; *wood wool*, the fiber of pine wood aseptically prepared, a light,

soft, and highly absorbent material, generally used in the form of dry pads; *lint*, a very soft, loosely woven linen with a nap on one side, like Canton flannel. This should always be cut—never torn—and placed with the smooth side next the wound.

Sutures of silk, silver wire, or catgut are used for bringing the edges of the wound together and holding them in place.

Ligatures of heavier silk or catgut are used for tying arteries, etc. Both sutures and ligatures should have their strength well tested before they are laid out for use. The silk is rendered aseptic by boiling for an hour in a five-per-cent carbolic solution, and is kept in a similar solution, or in alcohol, until wanted. Catgut is first immersed in ether, then boiled in absolute alcohol, in which it is kept.

Sponges of fine quality are much used in operation cases, and they need to be treated with the greatest care. It is so difficult to be sure of getting them perfectly aseptic that they are always a source of anxiety to the surgeon, and some operators will not use them at all, substituting pieces of aseptic gauze. New sponges are first to be thoroughly washed in warm water until all particles of sand and lime are removed. They are then to be placed in a solution of permanganate of potash, ʒ ij to the gallon of water, and allowed to remain in this solution two hours. A solution of hyposulphite of soda, ℥ iij to the gallon, is now made up, and to it is added ℥ ji of hydrochloric acid. The sponges must be *immediately* transferred to this second solution, and are kneaded rapidly several times. If allowed to remain in this second solution too long they will become macerated. Finally they are washed again in pure water until perfectly clean and free from odor, and are then placed in

a five-per-cent (1–20) carbolic-acid solution until required for use, or are preserved dry in tightly closed glass jars. They must not be put in a bichloride solution. Sponges which have been used may be freed from blood and coagula by washing first in a saturated solution of soda, and afterward in pure water. They must then be kept in the strong carbolic solution for at least fourteen days before they are used again, renewing the solution once during that time. Sponges which have been in contact with pus are, however, most safely burned.

The care of the sponges, dressing materials, and instruments used in operations forms an important part of the work of a surgical nurse. She must acquire familiarity with the names of instruments in order to be able to pass them without hesitation when called for, and after an operation she will usually be expected to clean and return them to their cases. This must be done so thoroughly that they will be surgically—that is to say, aseptically—clean, all ready for the next use; they must be washed carefully, for they are expensive, and many of them so delicate as to be easily ruined by careless handling. Instruments with cutting edges, as knives and scissors, should be taken by themselves and washed carefully one by one. Never throw them in a heap together, but lay them down so that they will touch nothing to blunt their fine edges. All instruments should be as far as practicable disjointed, catches unlocked, and tubes syringed through. Before putting instruments in any disinfectant solution wash all the blood off with soap and water. Tar soap is good for this purpose. Every stain must be removed. Rough surfaces need to be scrubbed with a brush. Silver and steel may be polished with a little whiting moistened with alcohol. In-

struments entirely of metal may then be boiled for half an hour, but those having handles of ivory or bone must not be put into hot water, as it is likely to crack them. After most through washing, these may be laid to soak in 1–20 carbolic. Finally, dry each perfectly, especially about the joints, and put away each in its own place, so that they will not touch one another.

CHAPTER XV.

Operations—The nurse—The patient—The operating-room—Giving anæsthetics—After care of patient—Shock—Blood-poisoning—Conduct of a laparotomy case.

It is in operative cases particularly that it is most important for a nurse to be conversant with the principles of asepsis and antisepsis, and to understand their practical application. The antiseptic methods of treatment enable the surgeon to bring to successful results to-day operations which but a few years ago would have been regarded as utterly impossible; and they necessitate at every step the intelligent, attentive co-operation of the nurse, for no amount of care or precaution on the part of the surgeon can counteract the bad effects of carelessness on her part. In every detail of preparation of her own person, of the patient, and all surroundings it must be continually borne in mind that nothing should be brought near the scene of operation which has not been rendered aseptically pure. Cleanliness and surgical cleanliness are two different conditions. It is not enough that all appliances should be free from foreign matter perceptible to the eye, not enough that they are spotless and shining, but they must also be absolutely free from any infectious particles, and must be kept so from the beginning to end of the operation.

The nurse who is to attend a critical operation should

not have been with any infectious case for at least two weeks previously. Should a sudden emergency make it necessary for her to be present in spite of such exposure, she must prepare herself by an especially thorough carbolic or sublimate bath from head to feet. The hair should in all cases have been recently washed with a strong solution of boric acid, that there may be no danger of the sifting down of epithelial scales in the form of dandruff, and should be closely confined under the cap. Of course only the most immaculate clothing, caps, and aprons are to be worn in the operating-room. Before touching sponges, instruments, or dressings, the nails, hands, and arms as high as the elbow are to be first thoroughly scrubbed with soap and water, by means of a stiff nail-brush; the soap is then rinsed off with clean hot water, and finally they are soaked for at least two minutes in some disinfectant solution, preferably bichloride of mercury. 1–2,000. Simply dipping the hands in the solution does not accomplish the desired object—the destruction of every latent germ.

The patient to be operated on should have a bath the night before, when sufficient notice is given, and on the morning before the operation a thorough enema. Only light food should be taken, and, unless very feeble, the patient should fast entirely for three hours before etherization. It is good routine practice to administer a dose of brandy or whisky half an hour previously. See that the patient passes urine the last thing before going to the operating-room. Have the hair well combed and tightly braided, so that it can not get loose and tangled. Artificial teeth must be taken out, and all tight bands loosened. Arrange the clothing so that it will be out of the way, well protected, and easy to change afterward it it should be necessary. If the operation is to be a

lengthy one, it will be a wise precaution for the patient to wear a flannel jacket, as cases of pneumonia have been known to result from prolonged exposure under ether. Remove all dressings from the part to be operated upon, and scrub it well with soap and water; if there is hair about the part, shave it, and cover closely with a towel wet with antiseptic solution.

In a private house you will have to get the room ready as well as the patient. Have it thoroughly cleansed, well aired, and at a temperature of about 70° F. for ordinary cases. If you are preparing for an abdominal section, the order will probably be 80°, as it is necessary to have great warmth where the intestines are to be exposed. There should be a long, firm table, on which the patient can lie, so placed that a strong light falls upon it, plenty of basins, pails, clean towels, hot and cold water, soap and a *new* nail-brush, pins, needles, and scissors. The doctor will tell you what else will be needed, and what dressings he wishes you to prepare. But these he will usually provide himself. All basins and receptacles for instruments or dressings must be carefully attended to, thorough cleanliness of both outer and inner surfaces being essential, inasmuch as the operating surgeon may touch the basin and immediately after may be called upon to introduce his hand into the wound. Do not for an instant forget that there must not be the smallest chance that anything may be brought near the wound which has been in contact with any even doubtful surface.

There is often a delay after everything is ready, for doctors are not always prompt, though the nurse must be. The time which must be spent in waiting for them is most trying for both patient and nurse. The mental condition of the patient is a matter of very

grave importance, sometimes seriously affecting the result. The nurse who is possessed of tact and judgment can do a great deal toward inspiring a serene and hopeful frame of mind.

The instruments, and as far as possible everything that is disagreeably suggestive, should be covered. In the hospital, the anæsthetic is given before the patient enters the operating theater; as a rule, the same plan will be followed in private practice.

At an operation in a private house the nurse will be called upon to do many things which in a hospital fall to the lot of the junior interne; she may even be called upon to administer the anæsthetic. This will be ether or chloroform, or a mixture of the two. Ether is poured, two or three drachms at a time, on an inhaler, made large enough to fit over the mouth and nose, the air being entirely excluded. In operations performed after dark it must be kept at a safe distance from the gas or lamp, as it is inflammable. The part of the face to be covered by the cone may be anointed with vaseline, to prevent irritation by the ether. Chloroform is not given in the same way, but is sprinkled a few drops at a time on a handkerchief, and held at a distance of two or three inches from the patient's face, which it must never be allowed to touch; a mixture of atmospheric air is needed. The proportion of chloroform inhaled should not exceed four per cent. Chloroform as an anæsthetic is more agreeable and more rapid than ether, and is less likely to nauseate, but it is more dangerous, as it has a powerfully depressant effect upon the heart. The head must be kept low, and the patient should on no account be raised to a sitting posture while under its influence. The signs of danger are a feeble pulse, a livid face or extreme pallor, stertorous or irregular and gasping respi-

ration. If you are charged with giving the anæsthetic, do not try to do or see anything else at the same time; the patient requires your undivided attention. Keep your finger on the pulse and your eyes on the face, and at the first warning indication stop giving the vapor. No anæsthetic should ever be given except under the direction and in the presence of a medical man.

A properly made and protected bed should be all ready, to which the patient may be transferred as soon as the operation is over. He must be kept warm, and as quiet as possible, free from all excitement, and should not be allowed to sit up for any purpose. After any operation the strength needs to be kept up by nourishing food, but only in fluid form, until the doctor's permission is given to vary it. The wound must be so arranged that the dressings can be observed without waking the patient, and, particularly during the first twenty-four hours, it must be carefully watched for secondary hæmorrhage. If an operation has been properly conducted, the after-care of a wound will be simple. Dressings are now renewed much less frequently than formerly. An amputation stump or breast may not be disturbed for a week; a joint not for two or three weeks. To keep the patient quiet and to support his general strength while Nature does her reparative work, is all that is required.

After a severe operation or injury a complete prostration of the nervous system not infrequently occurs, known as a state of shock. Loss of blood and debility favor shock. It may even be caused, in a feeble subject, by sudden strong emotion. The patient becomes pale, and faint or trembling, the mind confused or apathetic, the surface is covered with cold perspiration, there is often nausea, and sometimes relaxation of the sphincters,

causing involuntary passages. It may result fatally, the patient sinking into collapse. Brandy and strong beef-tea should be given (by enema, if the patient can not swallow), and heat applied to the extremities. It is in such cases that hypodermatic medication is especially valuable. A hot-water bag over the heart is a powerful stimulant. The efforts to revive the patient must not be continued until they excite him, and he should not be allowed to make any effort himself.

If a patient after a surgical operation escapes death from shock or hæmorrhage, there is still a third great danger to which he is liable—that of blood-poisoning. This is now happily rare, but it is well to be acquainted with the symptoms of such forms of it as may be encountered if aseptic precautions are not thoroughly taken.

Erysipelas is most contagious, and any patient developing symptoms of it must be promptly isolated. It is most frequent in lacerated wounds, and in those of the head and hands. The secretions of the wound are diminished, and its edges become red and swollen. In a day or two a blush appears about it, of a uniform red color, disappearing on pressure. There will be a high temperature, a quick pulse, headache, nausea, and a coated tongue. The disease may terminate favorably in from ten to fourteen days, but is often fatal.

Pyæmia is usually initiated with a chill, accompanied by a high temperature, and followed by profuse perspiration. The secretions from the wound are arrested, the pulse is fast and feeble, and the expression of the face is anxious. Abscesses are liable to form in parts of the body distant from the wound, especially in the joints. The chills may recur at intervals of from eight to twenty-four hours, but there is the greatest irregularity

in their manifestations. The disease is usually fatal in from four to twelve days. Curative measures amount to little. Try to maintain the patient's strength, and to keep the fever down. Free ventilation and perfect cleanliness are of the utmost importance, the disease being most often occasioned by fault in this direction.

Septicæmia is a rather less dangerous form of blood-poisoning than the preceding. It occurs without the repeated chills, is characterized by a high but more regular fever, and a general typhoid condition. There is more probability of a favorable termination. In general the difference between pyæmia and septicæmia may be thus defined: The latter is a local, the former a general, expression of blood-poisoning from an infected wound.

Tetanus is a usually fatal complication, more often following slight wounds than severe ones. It often results from exposure of the wound to cold. It is marked by a certain muscular rigidity, which sets in abruptly, beginning with the muscles of the throat and jaw, and gradually extending until the whole body is in continuous convulsions. It is important that the symptoms be recognized early.

In addition to these general remarks, it may be well to follow in detail the conduct of the nurse before, during, and after a capital operation. We will take as an example a case of laparotomy or abdominal section, as here, perhaps more than anywhere else, antiseptic precautions down to the veriest minutiæ are vital in their importance. The room must first be prepared for the scene of operation, and this is often, especially when it must take place in a private house, left entirely to the nurse. The room should be cleaned the day before, that it may have time to be well aired. The carpet and curtains, all drapery and superfluous furnishings, should be

removed, the floor scrubbed, the wood-work, and, if practicable, the walls also, washed with a solution of bichloride, 1–2,000. It is indispensable that a room be selected which can be well lighted and ventilated. The first requisite is a firm, strong, narrow table, upon which the patient will lie during the operation. This must stand where the light is best, and so as to be accessible from every side. Cover it with a thick blanket or quilt, a rubber cloth, and over both a clean sheet, all so tucked in that no portion will be left hanging over the edge. A thin pillow with a rubber case under the muslin one will also be needed, and a couple of light blankets with a second rubber sheet to cover the patient. On a smaller table place dishes of glass, china, or new agate-ware to receive the instruments. A third table may be needed for dressings, ether, towels, etc., and a wash-stand with hot and cold water, soap, nail-brush, and towels for the use of the surgeon. Not less than three dozen clean towels will be required, and three pails or bowls for washing the sponges—one to contain clear water, one for the warm antiseptic solution, and one for the clean hot solution in which sponges and towels are to be wrung out when called for. A basin to receive these after use will be wanted, and all these things must be aseptically clean inside and out. The sponges, and usually the dressings, will be provided by the surgeon—at least he will give explicit directions about them. A broad flannel binder, or a Scultetus bandage, which is preferred by some operators, should be in readiness. The bed to which the patient is to be transferred after the operation is to be made and protected in the same way as for a confinement case, tightly pinned, so that it can not work into wrinkles, as it will be some time before it can be renewed.

On the evening preceding the day of operation the patient is given a special bath and the hair about the pubic region is shaved, care being taken not to cut the skin. A towel soaked in a soap solution (soft soap forty per cent to water sixty per cent) is placed upon the abdomen, coming well down over the pubes and held in place by a few turns of a roller bandage. Some prefer a moist bichloride dressing. This remains on all night. In the morning a thorough enema is given, and a specimen of the urine is saved for examination. The soap towel is then removed, and the abdomen is washed with alcohol to take off all the soap. Another towel, which has been soaked in 1–1,000 bichloride solution, and wrung fairly dry, is now placed upon the abdomen, and secured like the other by a bandage. The patient is carried to the operating-table with this in place; it is not removed until the last moment. Just before etherization the patient must be catheterized, no matter how recently urine has been passed.

The nurse enters the operating-room with surgically clean hands and apron. Once there, her business is to wait on the doctor, to keep out of the way, and to watch every instant to see that nothing is handed to him which has touched any doubtful surface. Should you rest your own hand on the table, wash it again—not merely dip it—in the antiseptic solution. Should a sponge or a towel chance to fall on the floor, lay it aside, and on no account use it again. And remember that, whatever your interest in the proceedings, you are present not as spectator but as assistant, and keep on the lookout, not so much to see what the surgeon is doing, as what he is likely to want next. A second nurse will wash the sponges, if these are used, first in plain water to rinse out the blood, then in the warm antiseptic solution.

Finally they are dipped in hot antiseptic, and squeezed as dry as possible before they are handed to the surgeon. No one detail is more important in these cases than the counting of the sponges. Count them carefully before the operation begins, and make a written memorandum of their number. Do not trust your memory. Neglect of this precaution has caused more than one death. You will be expected to account for every one, and if any are missing you must notify the surgeon before the abdominal wound is closed. The operation having been completed, and the dressings, which must be aseptic beyond suspicion, having been applied, the patient is put to bed and the room cleared as speedily as possible of all traces of the operation. Hot-water bottles, *well protected*, must be in readiness, and stimulants at hand. The shock is great in laparotomy from the number of nerve centers involved.

It is better not to place the pillow under the patient's head until the effects of the ether have worn off. If there is vomiting, the abdomen should be gently supported by a hand on each side of the wound, to avoid any strain upon the sutures. If the vomiting is persistent, the application of ice-cold cloths to the throat will frequently control it. It is important to distinguish the ether vomiting after laparotomy from the vomiting of early developing peritonitis. In the former, which occurs soon after the operation, everything is rejected as soon as swallowed, and it stops if the stomach is empty, while with acute peritonitis, the patient may take nourishment for hours, and then suddenly throw up a large quantity of greenish or yellowish fluid having a sour smell. Peritonitis usually develops from twelve to forty-eight hours after the operation.

Sometimes medicine will be ordered which it is very

important to have retained. The simple procedure of cold applications to the throat above mentioned will often prevent its rejection, and it will add to their good effect if immediately after the administration of the dose a few drops of ice-water are forcibly sprinkled on the patient's face. The patient must not be allowed to overload her stomach with ice-water, however much she may desire it. This is one of the few cases in which water is withheld as much as possible. Very hot water will allay the thirst better than ice-water, and does not leave the mouth in such a parched condition, nor is there the same danger that the patient will desire to drink too much of it.

During the first twenty-four hours it is necessary to watch carefully for any symptoms of hæmorrhage. The same symptoms present here as in cases of hæmorrhage elsewhere. Should the nurse suspect it, she should remove the pillow, slightly elevate the foot of the bed, apply hot water bottles to the extremities, having notified the surgeon as soon as the condition is recognized.

The urine should be drawn, unless otherwise instructed, every six hours for the first forty-eight hours; after this the patient may pass her own urine, care being taken to disturb her as little as possible with the bed-pan. The urine must be measured, carefully observed, and a specimen saved for examination. It is also important to note whether or not the bowels move, and the character of the defecations, paralysis of the intestines being one of the possible complications to be looked out for.

The most full and accurate bedside notes should be kept, recording every change in the patient's condition. The temperature, pulse, and respiration are usually taken every four hours for the first few days; however,

the nurse should be able by touching the patient to note any marked variation from the temperature last taken, and, if necessary, take it again at once. The nourishment, of course, must be such as is ordered by the surgeon.

Rectal nourishment and medication may be necessary, and must be administered with the greatest care. Sometimes the patient will be nourished entirely by rectum for several days following the operation, with a view to giving the stomach a complete rest. Tympanites, if it develops, may be relieved by the introduction into the rectum of a tube through which the gas may escape.

When permission is given for the patient to be turned on her side, the nurse must see that the whole body is turned at once, and very gently, so that no twist or strain will come upon the wound. She must never be turned until the surgeon has given distinct permission. When the time comes for the stitches to be removed the same antiseptic precautions must be observed as when they were put in—hands, instruments, and fresh dressings all sterilized with the same care as in the first place. The patient will probably not be taken out of bed, but may be protected by means of rubber sheets above and below the bandage. Over these must be spread towels wrung out in bichloride of mercury, 1–1,000. The instruments must be perfectly aseptic, and handed to the surgeon in a dish containing carbolic acid, 1–30.

The nurse who watches a laparotomy case shares a great responsibility, and the recovery of the patient depends to a very great extent upon her ability and faithfulness. She can in many ways make the patient more comfortable, but she must often seem cruel to be truly kind, and in no case is scrupulous fidelity to orders more obligatory.

CHAPTER XVI.

Bones: their number, uses, arrangement, composition, growth, diseases—Fractures: varieties, symptoms—Special fractures—The process of repair—The treatment of fractures—Dislocations—How distinguished from fractures—How reduced—Sprains.

The human skeleton is composed of more than two hundred different bones. These bones constitute the framework of the body, and serve to protect the delicate vital organs. There are three important cavities in the body—the skull, the chest, and the pelvis—each wholly or partly inclosed by bone, and held in position by the spinal column. This itself forms a canal containing the spinal cord, a continuation of the substance of the brain.

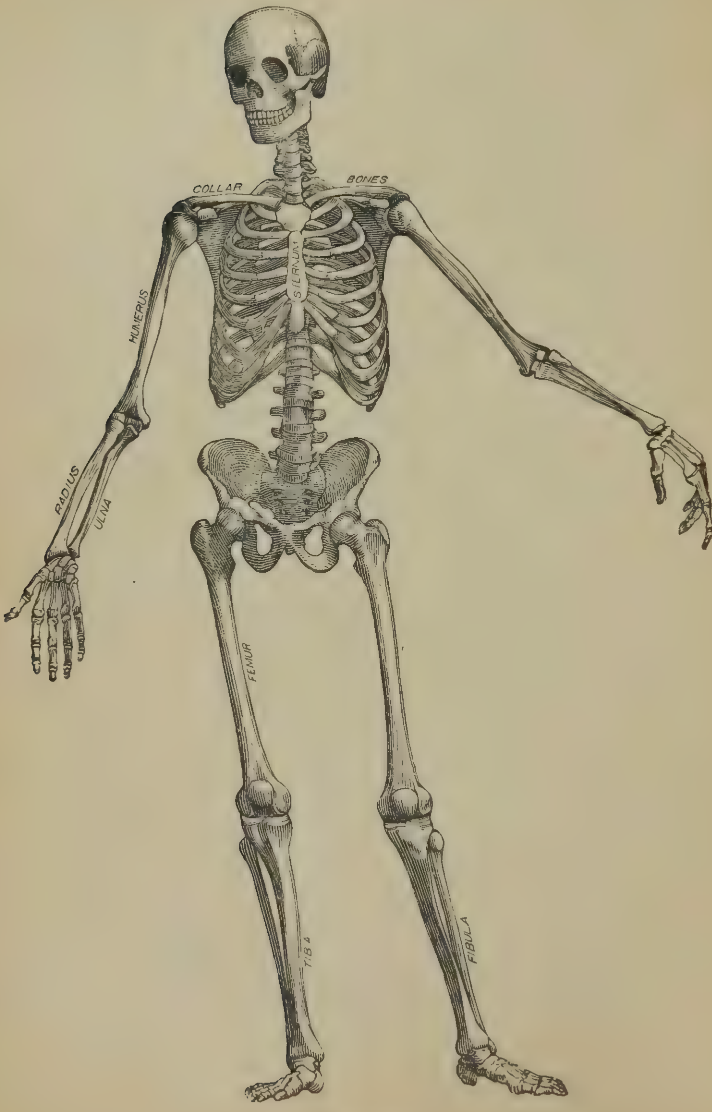
The skull is divided into two parts: the cranium, composed of eight, and the face, of fourteen bones, besides those of the ears. The seams or lines of union of these bones are called *sutures.* That between the two parietal bones is the *sagittal* suture; that connecting the parietals with the frontal is the *coronal* suture; that between the occipital and the parietals, the *lambdoidal.* These are the most important ones.

The head rests upon the first of the spinal vertebræ, which is called the atlas; the one next to this is the axis; these two allow the movements of the head in every direction. The spine consists of thirty-three

bones, called cervical, dorsal, and lumbar vertebræ, according to the position which they occupy. Those of the different groups have differences also in shape, by which they are recognizable.

From either side of the dorsal vertebræ spring twelve ribs, forming the framework of the thorax or chest. The first seven are connected in front with the sternum or breast-bone, and are called true ribs; the lower five are distinguished as false ribs, three of them being connected only with the costal cartilages in front, and the last two having no attachment except to the vertebræ. These are termed floating ribs. At the lower extremity of the sternum is the ensiform cartilage. Joined to the upper end of the sternum in front, and to the scapula, or shoulder-blade, in the back, is the clavicle or collarbone; also fitting into a cavity of the scapula is the humerus, the largest bone of the arm. The upper arm has but this one bone; the forearm has two, the ulna and the radius. The ulna is the larger. It makes a perfect hinge-joint with the humerus. The two prominences at the elbow are called respectively the olecranon and the coronoid processes. The lower end of the ulna articulates with the radius but does not enter into the wrist-joint. This is formed by the lower and larger extremity of the radius, articulating with the eight small bones which make the carpus or wrist. Besides these there are in the hand five metacarpal bones, forming the palm, and fourteen phalanges, three in each finger and two in the thumb.

The back of the pelvic wall is formed by the sacrum. This consists in early life of five distinct bones, which later become fused into one. The coccyx, the extreme end of the spinal column, is also formed by the union of four small bones. The remaining walls of the pelvic



The skeleton.

TABLE OF THE BONES.

Bones of Head.		Trunk.			Limbs.	
Cranium.	1 Frontal.	Spinal Column.	7 Cervical Vertebræ.		Upper Extremity, *each*	1 Clavicle.
	1 Occipital.		12 Dorsal Vertebræ.			1 Scapula.
	2 Parietals.		5 Lumbar Vertebræ.			1 Humerus.
	2 Temporals.		5 Sacral	Becoming fused in the adult.		1 Radius.
	1 Sphenoid.		4 Coccygeal			1 Ulna.
	1 Ethmoid.		1 Sternum.			8 Carpal.
Face.	2 Nasal.		1 Hyoid.			5 Metacarpal.
	2 Malar.	24 Ribs.	14 true.			14 Phalanges.
	2 Lachrymal.		10 false.		Lower Extremity, *each*	1 Femur.
	2 Palate.		4 floating.			1 Patella.
	1 Vomer.	Os Innominatum (Hip-bone), *each*	1 Ilium.	Fused in adult.		1 Tibia.
	2 Turbinated.		1 Ischium.			1 Fibula.
	2 Superior Maxillary.		1 Pubis.			7 Tarsal.
	1 Inferior Maxillary.					5 Metatarsal.
Ear, *each*	1 Malleus.					14 Phalanges.
	1 Incus.					
	1 Stapes.					

cavity are composed, on each side, of three bones, the ilium, ischium, and pubis, uniting in adult life into one, the os innominatum.

The lower extremity of the body has its bones arranged very much like those of the arm. The thigh-bone or femur is the largest bone in the body. It has a round head, which fits into a cup-like cavity of the os innominatum, called the acetabulum; below this is a narrow neck and two bony projections, the greater and less trochanters. The lower end of the femur articulates with the tibia, the larger bone of the leg. In front of the knee-joint is a thick triangular bone, the patella or knee-pan. Parallel with the tibia is a much smaller bone, the fibula. The foot has three divisions: the tarsus, having seven bones, the metatarsus, of five, and fourteen phalanges, arranged like those of the hand.

The skull contains the brain and organs of special sense; the thorax, the organs of circulation and respiration; while the lower part of the trunk sustains those of digestion and reproduction.

The bones are composed of about two parts of mineral to one of animal matter. Lime is the main mineral and gelatin the predominant animal constituent. Each bone is enveloped in a white fibrous membrane known as the periosteum. This supplies nutrition to the bone. At the joints, or articulations, the bones are covered with a layer of smooth, somewhat elastic cartilage, and furnished with a serous membrane which secretes a lubricating fluid, the synovia. Bones increase in length by the ossification of these layers of cartilage—a new layer being deposited as the older one hardens into bone; this growth is more rapid at the lower ends of the bones. Similarly they increase in thickness by the continual conversion of the periosteum into osseous

structure. In youth the proportion of animal matter is greater than in advanced life; in old age the bones, lacking the gelatinous element, break more readily and take longer to unite. Like the other organs of the body, they are liable to various diseases and injuries. Softening of the bones—mollities ossium—results from an absence of the normal amount of mineral deposit. Periostitis—inflammation of the periosteum—occurs usually associated with an inflammatory condition of the bone to which it belongs. Inflammation of the substance of the bone itself is known as osteitis. Caries is ulceration of bone; necrosis, death of the bone tissue in mass. This is most common in the shafts of the long bones. It is usually of traumatic origin, and always due to defective nutrition of the bone. Inflammation of the synovial membrane is called synovitis.*

Fractures are the most common injuries of bones. A simple fracture is one in which the bone only is divided. When there is also a wound of the soft parts, by which the broken bone communicates with the outer air, the fracture becomes compound. A flesh wound existing together with a fracture does not render it compound unless it leads down to the seat of fracture. A multiple fracture is one in which the bone is broken in two or more places. A comminuted fracture is one in which the bone is broken into several small fragments at the same point. A comminuted fracture may be either simple or compound. A complicated fracture is one in which some joint or cavity is involved in the injury. An impacted fracture is where one end of the broken bone is driven forcibly into the other. In young children, whose bones are soft enough to bend, we get occa-

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* Note that the termination *itis* always means inflammation.

sionally a partial fracture, of the convex side only, not extending through the bone. This is also called an incomplete or green-stick fracture. Fractures may be transverse, longitudinal, or oblique in direction; the majority are more or less oblique. A fracture is most serious when there is great injury of the soft tissues, or when a joint is involved. The nearer a large joint it occurs the graver the prognosis. The signs of fracture are pain, distortion, loss of function, or unnatural mobility, and crepitus. Crepitus is the grating made by rubbing together the ends of the broken bone. It can not always be obtained, as the fracture may be impacted, or some portion of muscle intervene.

Some special fractures give special symptoms. A fractured spine is indicated by loss of sensation and power of motion below the point of injury, paralysis following in consequence of pressure upon or laceration of the spinal cord. Fracture of the spine above the fourth cervical vertebra, as a rule, causes instant death. With fractured ribs, the patient will complain of sharp pain when he takes a deep breath or coughs, and will often spit blood. The danger from fracture of the ribs or sternum is of injury to the heart, lungs, or large blood-vessels by the broken ends. Fracture of the sternum is rare. Ecchymosis of the eye or behind the ear, or the escape of fluid through the ear, may be a symptom of fracture of the base of the skull. The patient may or may not be insensible. Fracture of the clavicle is one of the most common. Those known as Pott's and Colles's are also frequently met. Pott's fracture is of the lower end of the fibula, usually complicated with dislocation of the ankle-joint, and fracture of the inner malleolus. Colles's fracture is of the lower end of the radius, and results from falling upon the hand.

Barton's fracture extends obliquely into the wrist-joint, occasioning more inflammation and greater impairment of motion than does the Colles's.

The process of repair of broken bones is, although slower, essentially the same as that of the soft tissues. For the first two or three days after the injury blood is effused around the broken ends. This is gradually reabsorbed; and during the second week a quantity of lymph is thrown out between and around the fragments, which by degrees hardens, gluing them together. This new bone material is called callus; that between the broken ends, intermediate callus; that surrounding them, provisional callus. When the fragments can be maintained in complete apposition there will be no provisional callus; it occurs only where there is mobility of the broken ends. You will always find it in the ribs, which can not be kept perfectly at rest; seldom in the patella, the olecranon, or the cranium. After a fracture is solidly mended the provisional callus is reabsorbed. In four or five weeks the callus will usually be hard enough to keep the bones in place, though it is not firm enough to leave unsupported under six or eight weeks, and only becomes converted into solid bone after the lapse of months. Small bones unite more quickly than large ones. Cartilage, once destroyed, is not repaired.

The treatment of fractures consists in putting the fragments in proper position, and keeping them there till the callus has had time to form and harden. For this purpose splints are used, made of wood, tin, pasteboard, gutta-percha, leather, felt, or anything that will hold the bone accurately and firmly in place. A splint must be long enough to include both the joints between which the fracture is situated. It needs to be well padded, so that all prominences shall be protected from

pressure. A gutta-percha splint is cut an inch larger in every direction than the size required, as it shrinks upon soaking in boiling water, in which it has to be immersed to soften it. It is then molded to fit the part, and left on until cold, when it will have hardened into the desired shape. It should afterward be lined with chamois-skin, and perforated all over for ventilation. Sole-leather may be similarly softened and fitted. It does not interfere with the action of the skin so much as the gutta-percha.

In place of such splints are frequently used bandages saturated with starch, glue, or plaster of Paris, which harden in drying, and hold immovable the part to which they are applied.

Plaster-of-Paris bandages are prepared by rubbing into the ordinary coarse brown gauze and muslin rollers as much of the dry plaster as they will carry. They are then rerolled, and, if not to be at once used, kept in a tin box. Soft flannel bandages are first put on the broken limb, and over these those containing the plaster, having been wrung out in water. The addition of salt to the water will cause the plaster to set more rapidly. It usually takes about twelve hours. Another way is to mix plaster of Paris with water to the consistence of thick cream, and dip in the mixture folds of sheet lint or old soft cloths. Apply with a roller bandage. Starch bandages are put on in the same way, strips of wet pasteboard being included for greater firmness. Starch takes two or three days to dry thoroughly. A "water-glass" splint is made by saturating white-gauze bandages with a solution of silicate of soda, and applying several layers of them. Those on the outside should be cut with a selvage.

With either of these, the broken limb must be kept

perfectly still until the bandages are firm. Sand-bags are used to keep them in position; if they are heated it will hasten the drying. The bags should not be more than three quarters full, the sand fine and well dried, and the covering of texture close enough to keep it from sifting through. Chamois-skin is an excellent material for this purpose. If a plaster splint is where it is likely to be soiled, it is well to brush over the surface, after it is dry, with Damar varnish, as it can then be washed. When a plaster splint is to be cut off, it will facilitate the process to moisten it with dilute hydrochloric acid along the proposed line of incision. It may be necessary also to cut openings for the escape of secretions from a wound, in which case the position should be accurately noted before the plaster is applied. But for a compound fracture a fracture-box is usually preferred, as the wound will be more accessible. It must be well padded with bran or jute. The sides of the box to which the limb is bandaged answer the purposes of a splint.

Before applying any apparatus the part must be carefully washed and dried, and it is well to dust it over with fine starch or toilet-powder to absorb perspiration. A fractured limb is extended until its length, measured from fixed points, matches the corresponding one. If this extension can be kept up otherwise, splints will not be required. With Buck's extension, for thigh fracture, the leg is bandaged securely to a sliding frame, and kept in position by a heavy weight attached to the foot and leg by adhesive straps. The foot of the bed is elevated, so that the weight of the body affords counter-extension.

In lifting a broken limb, support the parts both above and below the point of fracture, being careful neither to shorten nor twist it. By unskillful handling

a simple fracture may easily be converted into a compound and much more serious one.

A dislocation is displacement of one of the bony structures of a joint from the other. It may be, like a fracture, either simple or compound, or complicated with some other injury. The principal signs of dislocation are pain, impairment of motion, alteration in the length of the limb and in the direction of its axis. It is often difficult to distinguish it from a fracture. With a fracture only, crepitus may usually be obtained, the deformity is easily reduced, but returns as soon as the extension is discontinued, the pain continues after reduction, and the limb is never abnormally long. Where a dislocation exists alone, crepitus is rare, the deformity is not easily reducible, but when reduced is not likely to return at once, the pain is always relieved by reduction, and lengthening may exist. A dislocation is always accompanied by more or less laceration of the ligaments and contusion of the adjacent soft tissues. Chloroform or ether is usually given to secure muscular relaxation, and reduction is then effected either by gradual manipulation or forcible extension.

Laceration or stretching of the ligaments, with twisting of the joint, short of displacement, constitutes a sprain. Such an injury is very painful, and it often takes longer to recover from it than from a fracture. The tendency to inflammation is discouraged by entire rest, with elevation of the sprained joint. Hot applications are better than cold. When it is first used again, it is customary to support it by bandaging or strapping.

Abnormal rigidity of a joint, resulting from injury, disease, or disuse, is known as anchylosis.

CHAPTER XVII.

The uses of bandages—Rollers—The spiral bandage—The figure-of-eight—Ways of applying them—Many-tailed bandages—The triangular bandage—Slings—Elastic bandages—Strapping.

BANDAGES are used to fix dressings in place, to give support, apply pressure, or prevent motion. Those in general use are the roller, single or double, the many-tailed, and the triangular bandages. Roller bandages are strips of muslin or flannel, from half an inch to eight inches wide, and from three to twelve yards long, evenly and tightly rolled upon themselves. If made of any material that will not tear evenly, they must be cut by a thread, to insure regularity of width and avoid fraying of the edges. The selvage and all loose threads must be trimmed off. If a bandage is to be wet, it is best made of something that has been washed, or inconvenience may arise from its shrinkage. An old cotton sheet is good material. To piece the strips, lay the two ends flat on each other, overlapping for an inch, and baste together all four sides, leaving raw edges. They must be rolled as tightly as possible, either on a regular bandage roller, or by hand. To roll a bandage by hand, fold the end of the strip over upon itself until you have a little roll stiff enough to keep its shape. Hold this perpendicularly between the thumb and fingers of the

right hand, letting the free end of the bandage pass over the back of the left hand between the forefinger and thumb. The right hand should now be kept perfectly still, while the fingers of the left grasp the side of the roll; a movement of the left wrist rotates it, and the left thumb and forefinger regulate the tension. A double-headed roller is made by rolling a bandage from both ends toward the center, or by basting together two single rollers.


To roll a bandage.

To put on bandages neatly and well is a good deal of an art, and one for which no exact directions can be given. There are a few general principles to be borne in mind, and then adaptations are to be made in each case to the shape of the part over which the bandage is to be applied, and to the object in view. A well-fitting bandage must lie smoothly, without wrinkles, making an even and not too severe pressure. It must not be loose enough to slip, nor tight enough to be painful or to impede the circulation. A tight bandage can be loosened a little without removing it, by cutting half through each turn; but if this does not give sufficient relief it must be taken entirely off. Inexperienced bandagers are very apt to make them too tight in the effort to avoid wrinkles.

In putting on a roller bandage, unwind no faster than is necessary, keeping the roll close to the body. In taking one off, roll or gather it up in the hand as fast as you unwind, keeping it in a compact form. For

bandaging fingers and toes, a roller half or three quarters of an inch wide is used, for the hand an inch, for the head or arm two or two and a half inches, for the legs two and a half and three inches, and for the body six or eight.

Nearly all kinds of bandaging are variations and combinations of two simple forms, the *spiral* and the *figure-of-eight*. A simple spiral bandage goes round and round, each turn overlapping the one before it by one third its breadth. This can only be used over a nearly straight part, as a finger. To accommodate it to the shape of a limb, reverses have to be made. This is done by placing a finger on the lower edge to hold it firmly, and turning the bandage downward over itself at an oblique angle. This brings it the other side out, and changes its direction. These turns can be made as often as needed, whenever the bandage will not otherwise fit smoothly. They should not be made over a prominence of bone, but are best at the back or on the outer side of the limb. The figure-of-eight bandage is more generally used than the spiral, as it fits better, and is, when familiar, more easy of application. It is wound alternately above and below some central point, over which the roll is carried obliquely. As in the spiral,

To reverse a bandage.

each turn covers two thirds of the preceding. The angles where the folds cross should be equidistant, and should succeed each other in a straight line. The figure-of-eight needs fewer reverses than the spiral bandage, but they are tc be employed as occasion requires. The spiral and the figure-of-eight may be used singly or in combination.

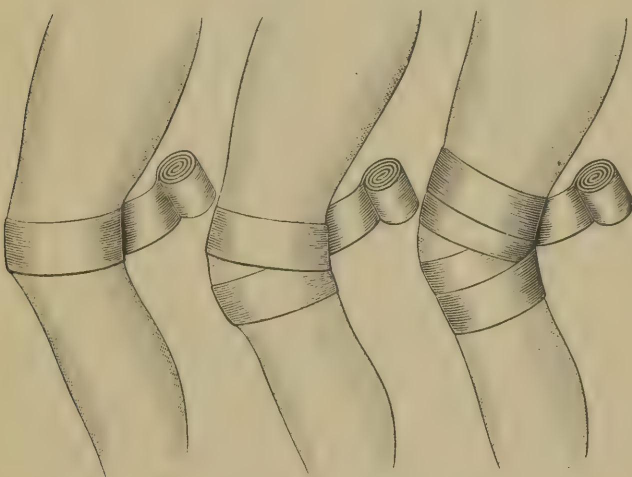
In bandaging any limb, begin always at the extremity, and work toward the center of the body from left to right. Hold the roller with the outer side next the limb, until reverses are called for.

To cover a foot, start the free end of the bandage at the instep, and make a turn around the base of the toes. Then carry the bandage diagonally over the foot, across the point of the heel, and back from the other side till it coincides with the first turn. Cover this, and carry a second turn around the heel, half an inch higher than the first; continue to make alternate turns under the sole and behind the heel, crossing over the instep, until the entire foot is covered. Finish with a couple of circular turns around the ankle, or continue up the leg. For covering the leg, the spiral bandage may be used with a succession of anterior reverses, or a continuous figure-of-eight. When the bandage is completed, the effect to the eye will be the same

Figure-of-eight on foot.

whichever method is adopted, but the latter will be far more secure, and will make more even pressure. It is always to be preferred.

In finishing off a bandage, make one or two straight turns, fold under the end and pin it, or split the last

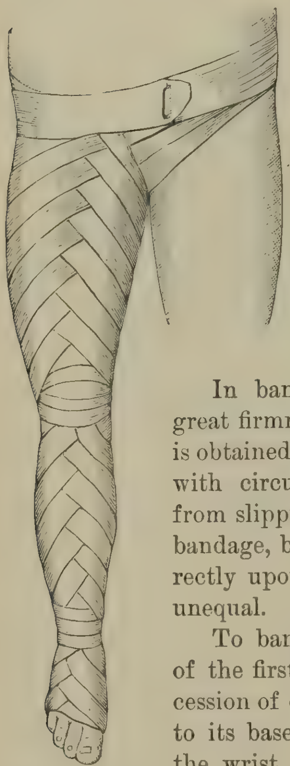


Mode of application of a hinge-joint bandage.

quarter of a yard through the middle, wind the ends in opposite directions around the limb, and tie them in a bow. To apply a bandage over a movable joint, as a knee, make first a circular turn directly over the center of the joint, then apply the figure-of-eight alternately above and below it, close enough to have the edges meet and entirely cover the first turn. This will allow some freedom of motion without displacing the bandage.

A bandage to cover the groin is commenced with two turns about the thigh; the roller is then carried diagonally to the opposite hip, round the waist, and

downward, crossing the first oblique fold in front of the thigh. Another turn about the thigh follows in the same direction as the first, and the same course is repeated, leaving proper spaces and making a series of figures-of-eight, till the bandage is carried sufficiently far. A bandage of this form, a figure-of-eight which includes two distinct parts of the body, is called a spica. This may be used either by itself or as a continuation of the leg bandage.



Spica on the thigh, with foot and leg bandage.

In bandaging over a splint, where great firmness is required, the best result is obtained by alternating figures-of-eight with circular turns, which keep them from slipping. This makes a very secure bandage, but not a good one to use directly upon the flesh, as the pressure is unequal.

To bandage a hand, begin at the tip of the first finger, and cover it by a succession of close spirals or figures-of-eight to its base. Then make a turn around the wrist to keep these from slipping, and return to the root of the second finger. Lead the bandage by one or two spirals to the tip of this, and then proceed down it, as upon the first finger, concluding with another turn about the wrist. Cover each finger successively in the same way. Then take a slightly wider

To bandage fingers.

To cover the palm.

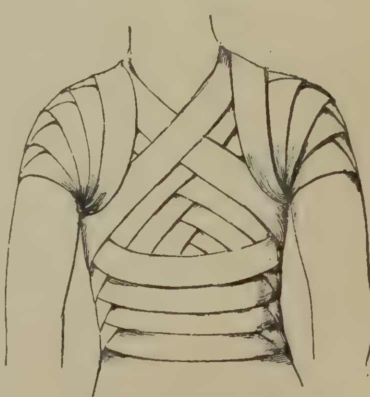
bandage, start it at the back of the hand, and wind it around the base of the fingers. Carry it obliquely across the back of the hand, around the wrist, back to the further side, and again around the palm. Continue these turns alternately till you have a line of crosses straight down the back of the hand, and the palm is completely covered. The thumb is finally to be dressed by making alternate turns over it and around the wrist. This is sometimes called the spica for the thumb. Before covering the palm of the hand, put a little absorbent cotton in it. Do the same at the flexures of any large joint that is to be covered by a bandage, to make it fit better, to absorb perspiration, and prevent chafing. This is especially important at the axilla.

Spica for the thumb.

A spica for the shoulder may be put on in much the same way as that for the thigh, beginning with one or two turns around the arm, carrying the bandage over the point of the shoulder, across the back, under the other arm, and over the chest to the shoulder again. Make another turn about the arm, and repeat three or four times as required.

Single shoulder spica.

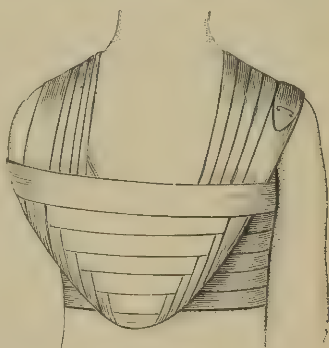
A double spica for the shoulders, which includes the entire chest, is commenced like the single spica, but the second turn across the back, instead of following in the line of the first, is carried down at a sharper angle, and brought around the waist. It is then carried again diagonally up the back to the opposite shoulder. Make two or three turns about this arm, as previously around the other, then carry the bandage down across the chest, around the waist, and up across the chest again to the shoulder from which it started. Wind it again about the arm, carry it obliquely down the back, around the waist, etc.,



Double shoulder spica.

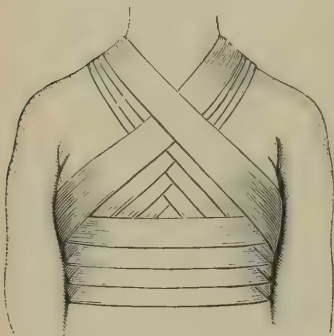
leaving the usual spaces, and following the direction of the previous turns, till the entire chest is covered. There should then be a line of crosses in the center of the front, in the back, and down each shoulder.

An admirable bandage for the arm and shoulder, in case of clavicle fracture, devised by the late Dr. C. H. Wilkin, of New York, is applied as follows: Place the arm ot the injured side on the opposite breast. Start the bandage in the middle of the back, between the shoulder-blades, and bring it over the well shoulder near the neck down to the outside of the injured arm just above the elbow. Then bring it under the elbow, leaving the tip exposed, and up over the injured shoulder to the starting-point, where it is pinned to the first end of the roller. Continue downward across the back, and round the body in a straight line, over the injured arm, just above the elbow-tip. Carry it round twice in the same place, and the second time cross the back upward to the well shoulder, and down again to the outside of the injured arm, and around the elbow as before, leaving the proper spaces. This is the best of the numerous bandages in use for fractures of the clavicle. Before applying any of them, a thick wedge—which may be made of a folded towel—is placed close under the arm so as to throw it slightly outward, and bring the fractured ends into proper position.



Wilkin's clavicle bandage.

The roller bandage may be so applied as to furnish support to one or both breasts, being put on either as a figure-of-eight passing around the neck or as a spica including the shoulders. Firm and even pressure can be made upon the breasts by a single broad band passing around them, the spaces between and at either side being first filled to a level with cotton. Straps over the shoulders will help to keep this in place.

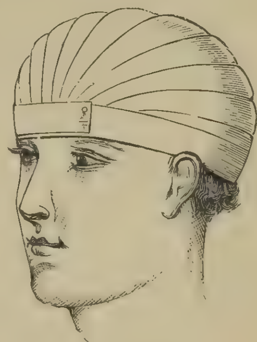


Breast bandage.

The figure-of-eight for the head is one of the most useful bandages for retaining dressings upon the scalp. This is put on as follows: Start the bandage over the ear, holding the roll toward the face. Carry it across the eyebrows, then around the back of the head as high as possible. Continue to wind it round, making each turn a little higher in front and a little lower in the back until you have covered as much surface as is required. Another is the Capelline. This is put on by a double roller, one end of which needs to be a third larger than the other. Stand behind the patient, and, taking the smaller roll in the right and the other in the

Figure-of-eight on head.

left hand, begin low on the forehead and carry them round the head as far down on the occiput as possible. Then transfer the bandage in the left hand to the right, and continue it round, while the other is folded over at right angles with it, and brought across the top of the head to the front in the left hand. Here it meets the other and crosses it, again running backward, and overlapping the former folds. These turns are continued until the whole head is covered, one bandage going round and round it and the other back and forth across it. All the folds leading from the front of the head to the back should be on the left of the middle, while those leading toward the front should be on the right. Finish with one or two extra circular turns. The head may be partially or entirely covered by a single roller, making alternately circular and oblique turns, and pinned at the angles.



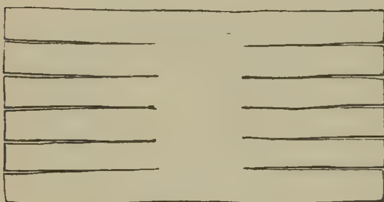
Capelline.

Cataract bandage.

To bandage a stump after amputation, either a single or a double roller may be used in much the same way as in bandaging the head, beginning at some distance from the end, making turns back and forth over it, and holding them firmly by circular ones.

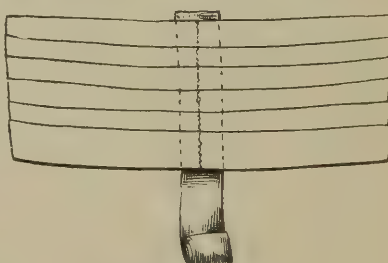
The figure-of-eight may be so applied as to cover the eye, and is often so used. Bandages for the eye should always be light. After the operation for cataract, a single straight strip of muslin is used, furnished with tapes to tie behind.

When it is important to avoid motion of the part to be covered, a "many-tailed" bandage may be used. This consists of a piece of muslin torn into strips from each side to within an inch or two of the center, which is left entire. Apply this to the back of the limb, and, beginning at the bottom, fold the strips from either side alternately around it, giving them an upward direction, and making them cross each other in front.



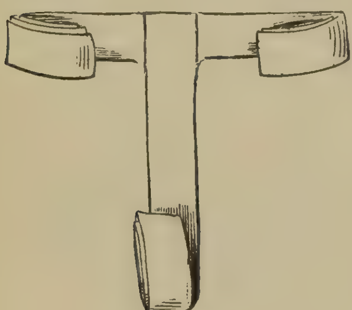
Many-tailed bandage.

The bandage of Scultetus is an improvement upon this. To prepare it, take a strip the length of the part to be bandaged, and sew across it at right angles other strips overlapping each other by two thirds their width. Without turning this round, lay it on a board, to keep it smooth, and slide it under the limb; begin at the bottom, and fold the strips one after another in a slanting direction over it. The strips from opposite sides should



Bandage of Scultetus.

cross in front and go half-way round again. This bandage can be applied with very little disturbance to the patient, the limb having only to be slightly lifted to slip the board under and again to remove it. The following form may be used after ovariotomy and other abdominal operations. Take nine strips of flannel, each four inches wide and one yard and a half long. Place two of these lengthwise on a table at a distance of six inches apart. Sew the other seven across them, beginning at the top and allowing each to overlap the one above it by a little more than half. Pass the bandage under the body, fold the cross strips over the abdomen from below upward, then bring the free ends of the vertical strips between the thighs, and pin them, one on each side to the front. These will keep the bandage from slipping up or wrinkling under the back. This arrangement has the advantage of allowing the wound to be dressed without moving the patient. It is sometimes used as a substitute for the ordinary binder after confinement. Other modifications of the many-tailed bandage are made to fit different parts of the body.



T bandage.

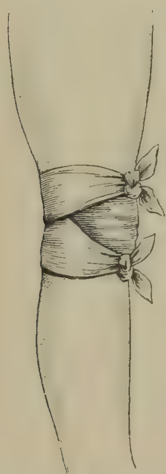
The T bandage is constructed on the same plan, but consists of two pieces only, at right angles to each other. Its chief use is to retain dressings upon the perinæum.

A four-tailed bandage is made by splitting a strip of muslin at each end to within a few inches of the center.

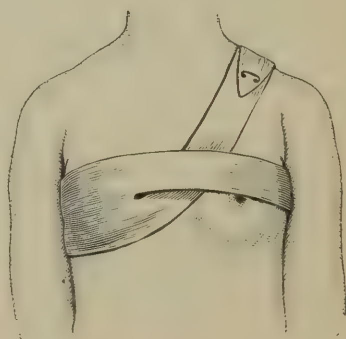
Such a one may be used to keep dressings on or give slight support to the knee. Place the center over the patella, carry the tails under the knee, cross them so

Four-tailed bandage.

that the lower ones will come above the joint, and the others below, bring them round, and tie in front, two above and two below the knee. The same bandage may be so adjusted as to support one breast, the center being



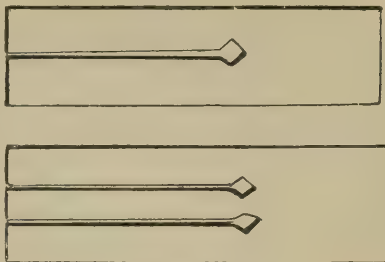
Four-tailed bandage on knee.



Four-tailed breast bandage.

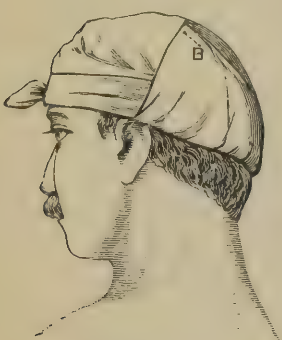
placed under it, the two lower tails meeting over the opposite shoulder, while the upper ones, crossing them, join under the arm.

For the jaw, take a strip a yard long and three inches wide, make a slit of three inches in the center, and split the ends to within two inches of it. Let the chin rest in this slit, carry the two lower halves up in front of the ears, and tie them together on top of the head, while the upper ends are carried back below the ears and tied together behind. Finally, bring these ends vertically upward, and knot them again into the corresponding ones from above.



Retractors.

Retractors are wide bandages having two or three tails, slit at one end only, used during amputations to keep the soft parts out of the way while the bone is being sawed.

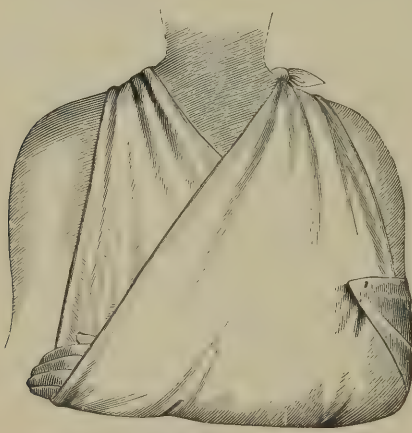


Shawl cap.

These are only a few of the many ways in which the roller and the many-tailed bandages may be used. The triangular bandage can also be applied in many different forms, and can anywhere be provided by folding or cutting a large handkerchief diagonally. On the head, it forms the covering known as a shawl cap. Place the center in the middle of the forehead, let the ends cross low down at the back of the

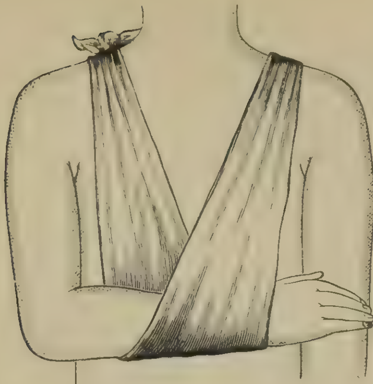
head, catching in the apex of the triangle, and bring them round again to be tied in front. In an exactly similar way it may be used to retain the dressing on a stump. To keep dressings in the axilla, fold over the rectangular corner of the triangle, place the center under the arm, cross the ends over the shoulder above, and bring them down, one across the chest and one across the back, to be tied together under the opposite arm.

It may be applied as a sling to the upper extremity in three ways. If the forearm is injured, its whole ex-



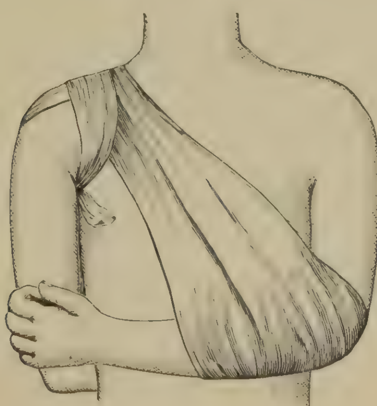
Sling for forearm.

tent should be supported equally, including the elbow. Carry the outer end of the sling around the neck, on the side to which the injured arm belongs, and the end between the hand and the chest around the other side, tying them at the back. If the injury is of the upper arm, the sling should support the wrist only, making no pressure on the elbow. Turn the hand with the palm



Sling to support upper arm.

toward the chest, and support it higher than the elbow. Cross the ends in the opposite direction from that above described. With a fractured clavicle or scapula, the front of the sling should bind the elbow well forward,



Sling for fractured clavicle.

and cover the hand, crossing upon the opposite shoulder the other end, brought up obliquely across the back, and tied with it under the sound arm. A foot may be slung by a wide bandage passing around the neck.

Rubber bandages are most used to reduce or prevent swelling. They should be put on without reverses, and special care is needed to avoid getting them too tight. Elastic stockings are used for the same purpose, usually in case of varicose veins.

Another means of affording support, or protection, to a limb, or other part, is by strapping with adhesive plaster. Cut the strips in the direction of the selvage, which must be taken off. Warm by holding the plain side over the flame of a spirit lamp, or on a bottle of hot water. If it is to be applied over a very uneven surface, immerse it in hot water and press it gently on with a cloth. For strapping a leg, cut the strips an inch and a half wide, and long enough to lap over six inches after passing around the limb. The hair should first be shaved off. Stand in front of the patient, and apply the middle of the strap to the back of the leg; bring the ends around and cross them in front, giving them an upward direction, like the sections of a many-tailed bandage. The next strip is put on a little higher, overlapping the first by a third, and so on, as far as required. For joints, the strapping should extend for some distance above and below, and the plaster is best spread on leather.

In case of fractured ribs, or whenever it is desired to limit the movements of the chest, strapping is sometimes employed in place of bandaging. It has an advantage in that it can be applied to one side alone.

CHAPTER XVIII.

Hæmorrhage—Different kinds—Causes—Amount—Natural tendency to arrest — Artificial modes of controlling arterial hæmorrhage: by cold — position — pressure — styptics — the cautery — ligation — torsion — acupressure — Venous hæmorrhage—capillary—Constitutional symptoms—Internal hæmorrhage—Hæmoptysis—Hæmatemesis—Hæmaturia—Uterine hæmorrhage—Epistaxis.

THE escape of blood from its containing vessels is hæmorrhage. According to the kind of vessel ruptured, it may be described as arterial, venous, or capillary hæmorrhage. It is usually easy to distinguish these. Blood from an artery will be of a bright-red color, and will spurt out in jets of considerable force from the side of the wound nearest the heart. The jets will correspond to the beats of the heart, not entirely intermitting, but subsiding into a steady flow between them. Venous blood is of a dark-purplish hue, and moves in a sluggish continuous flow, mainly from the side farthest from the heart. Capillary hæmorrhage is a mere oozing of blood. The first is by far the most dangerous. Hæmorrhage from a large artery, if not promptly checked, may prove fatal in a few moments.

All wounds are attended by more or less bleeding. Besides such, described as traumatic, there may be hæmorrhage caused by rupture of the blood-vessels, either from disease of their coats or of surrounding

parts. Hæmorrhage following shortly after an operation, when it has been once completely checked, is known as secondary. It arises either from giving way of the ligatures or from the extension of sloughing to parts not previously implicated. The danger of this is greatest during the first twenty-four hours, but is by no means over until the wound is well healed.

The amount of bleeding from a wound depends not only upon the kind and size of the cut vessels, but upon the manner in which they are divided. A wound crossing an artery will occasion more severe hæmorrhage than a longitudinal one, an incised wound more than one contused or lacerated, and a mere puncture more than a completely severed artery.

The arteries are always in a state of tension, and, when cut, the edges retract from each other and contract upon themselves, so lessening their caliber. The outlets are choked by the coagulating blood, and, when there is much loss of blood, fainting ensues, the action of the heart becomes slower, and less blood is sent to the wounded part. In these three ways Nature tries to arrest hæmorrhage, and moderate bleeding will soon be checked spontaneously when the blood is in a normal condition.

The application of heat or cold favors the formation of clots and the arterial contraction; elevation of the injured part reduces the force with which the blood is sent to it; these will often be the only treatment required, but in more severe cases, when blood is spurting from a wounded artery, further measures become necessary.

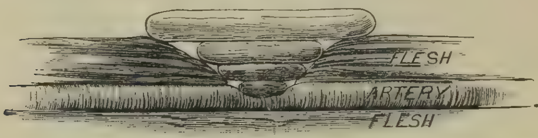
The most important of these, and one usually calling for no further apparatus than one's own fingers, is pressure upon the bleeding point or the vessels which sup-

GENERAL PLAN OF THE CIRCULATION.

CHART OF MAIN ARTERIES.

- **AORTA.**
  - Arch.
    - R. Coronary. / L. Coronary. — Supply walls of heart.
    - L. C. Carotid. . . . . — Internal Carotid—supplies brain. / External Carotid—supplies face and skull.
    - Innominata.
      - R. C. Carotid. — Internal Carotid—supplies brain. / External Carotid—supplies face and skull.
      - R. Subclavian. — Axillary—brachial — ulnar / radial — Palmar arch and digitals.
    - L. Subclavian. . . . . — Axillary—brachial — ulnar / radial — Palmar arch and digitals.
  - Thoracic.
    - Phrenic—supplies diaphragm.
    - Intercostal (10).
    - Cœliac Axis.
      - Gastric.
      - Splenic.
      - Hepatic.
    - Superior Mesenteric.
    - Inferior Mesenteric.
    - Renal.
  - Abdominal.
    - R. C. Iliac. / L. C. Iliac.
      - External Iliac—femoral—popliteal.
        - anterior tibial—dorsalis pedis. — Plantar arch and toes
        - posterior tibial.
          - external plantar. — Plantar arch and toes
          - internal plantar. — Plantar arch and toes
      - Internal Iliac—supplies pelvic viscera.
    - Lumbar.

ply it. There is no danger of serious hæmorrhage from a wound to which forcible digital pressure can be applied. If the bleeding vessel is too deep to be reached by the finger, the wound can be plugged by a compress of lint. To make this most effectively, cut a number



Direct compression of a wound by means of what surgeons call a graduated compress, made of pads of lint, folded in different sizes, with the largest one on top.

of small bits, each a little larger than the preceding, and, beginning with the smallest, press them well into the wound. The pile should extend to some little height above the surrounding level, and be secured by a tight bandage. Such compression can only be made successfully over a bony surface; where the artery is imbedded in muscle, it becomes difficult if not impossible to control it. Wounds of the head and face, though they are apt to bleed profusely, can almost always be controlled by direct pressure, as the skull affords firm counter-pressure. If the bleeding artery can not be reached in this way, it, or the branches leading to it, must be compressed at some point nearer the source of supply. Thus, bleeding from a finger or toe can be stopped by making pressure on both sides of it, above the wounded point. So, in any case, firm compression of the bleeding vessel between the wound and the heart will arrest the flow of blood. In order to be able properly and promptly to apply such pressure in time of need, every nurse should familiarize herself practically

with the course of the main arteries, know where to find them and how to control them. Actual experiment is the only way of rendering the information of much utility.

The aorta, the main trunk of the arteries, ascends from the upper part of the left ventricle for a short distance, then forms an arch backward over the root of the left lung, and descending upon the left side of the spinal column passes through the diaphragm into the abdomen. It is known in its different parts as the ascending and descending arch, the thoracic and abdominal aorta. From the arch of the aorta arise five branches: the arteria innominata, the right and left coronary arteries, the left common carotid, and the left subclavian. Of these the innominata is the largest. It extends for only about two inches, and then divides into the right common carotid and right subclavian. The common carotids run up each side of the neck, and divide into the external and internal carotids, the one with its branches supplying with blood the face and outside of the skull, and the other penetrating to the brain, through an opening in the temporal bone. The coronary arteries return and supply the walls of the heart.

Each of the subclavians runs along a groove in the first rib, and it is against this that pressure is made to control the circulation in the shoulder and arm. It turns downward over this rib, and takes the name of axillary for a short distance and then brachial. The brachial proceeds down the arm along the inner border of the biceps muscle to the front of the elbow, just below which it divides into the radial and ulnar arteries, which continue down the arm, one on each side, to the hand. In the hand, they and their branches reunite

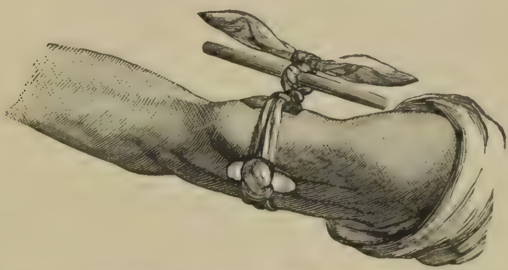
into a semicircle called the palmar arch. From this small arteries are sent off to each of the fingers. All these can be traced back to their origin at the arch of the aorta.

The aorta reaches as high as the third dorsal vertebra, then, descending, passes through the diaphragm at about the level of the twelfth dorsal. Opposite the fourth lumbar vertebra it divides into the right and left primitive or common iliac arteries. These are about two inches long. They diverge outward and downward, and, opposite the fifth lumbar vertebra and the sacrum, divide into the external and internal iliacs. The internal iliacs, after a course of about an inch and a half, are split up into numerous branches supplying the pelvic viscera.

Each external iliac continues downward and outward along the brim of the pelvis, and, half-way between the anterior spine of the ilium and the symphysis pubis, runs under Poupart's ligament, and takes the name of femoral. The pulsations in this can be distinctly felt at the groin. It descends along the inner side of the thigh in a nearly straight line till it reaches the lower third, where it again changes its direction and its name, becoming the popliteal, and passing to the back of the thigh and down behind the knee. Here it divides into the anterior and posterior tibials, which run down either side of the leg, and finally anastomose into the plantar arch, as do the ulnar and radial arteries into the palmar. From the plantar arch branches go to the toes.

The other principal branches of the descending aorta are the intercostals, the phrenic artery, the cœliac axis, and the superior and inferior mesenterics. These supply various internal organs.

The arteries most commonly compressed for the relief of hæmorrhage are the subclavian, the brachial, and the femoral. You should at least know how to find and manage these. If pressure can not be made forcibly enough by the fingers, or if it needs to be maintained for any length of time, a tourniquet can be used upon the brachial or femoral arteries. Before applying it, elevate the limb as high as possible, make a few turns of bandage about it to protect the skin, and place a hard pad directly over the course of the artery. In the absence of the regular apparatus, an impromptu tourni-



Manner of compressing an artery with a handkerchief and stick.

quet may be made of a handkerchief or strip of muslin, with a hard knot or a smooth stone tied in the middle. Fasten this rather loosely around the limb and twist it with a stick, keeping the knot over the injured artery until pressure enough is made to completely occlude it. This is sometimes called a field tourniquet. It will be of no use whatever unless so fixed as to make pressure directly upon the main trunk of the artery. A tourniquet may remain on the arm for an hour, on the thigh for two hours—not more, as the part will die if its nutrition is cut off too long.

The subclavian artery can not be reached by a tourniquet. The handle of a large key, or a blunt stick, suitably covered, may be pressed forcibly against it, behind the clavicle at the outer third of the first rib, in case of severe hæmorrhage from the shoulder or axilla.

Esmarch's plan for preventing hæmorrhage during an operation upon a limb is to apply a very tight rubber bandage spirally from its extremity to a point above the site of the proposed incision. Where this stops, a piece of rubber tubing, with hooks at the end, is wound several times tightly around the limb and fastened. The bandage is then removed, when the circulation will be found to be almost completely cut off. Where there is danger of secondary hæmorrhage from a limb, it is well to keep at hand a piece of heavy rubber tubing, which can be used as a tourniquet in case of need. A piece of tubing cut from a syringe is always available in an emergency.

With any secondary hæmorrhage, the first thing to be done is to remove all dressings so as to expose the wound to the air. Make digital pressure upon the wound, if it can be reached, assisted by pressure on the main artery, and notify the surgeon at once.

Flexion of a limb will sometimes aid in arresting hæmorrhage. Put in the joint a firm roll of lint, against which the pressure will come when the limb is bent. In case of bleeding from the palm of the hand, which will sometimes be profuse, direct the patient to clasp closely a wad of lint, at the same time holding the hand high above the head.

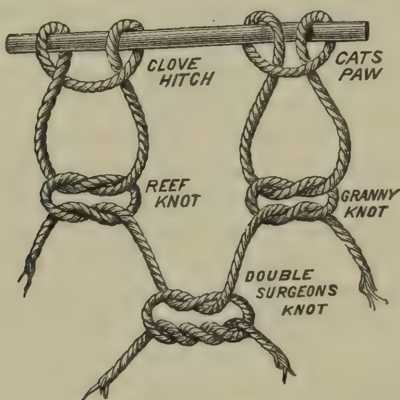
Besides those named—heat or cold, position, and pressure—there is still another means of arresting hæmorrhage to which a nurse may in an extremity resort, namely, use of astringents. Astringents used externally

are called styptics. The most useful are the subsulphate or the perchloride of iron, alum, gallic acid, and matico. Wring out a piece of lint in the dilute solution, and, having first wiped out the blood-clots, stuff it into the wound. The mode of action is by increasing the contractile power of the vessels. Nitrate of silver or lunar caustic acts somewhat similarly. Obstinate bleeding from a small point, as a leech-bite, may be checked by touching with this. Lunar caustic is sometimes spoken of as the potential cautery, having the effect, though more superficially, of cauterization.

The actual cautery—the application to the wound of a hot iron—is sometimes employed by surgeons when the bleeding is from many vessels over a large surface, or from a porous part which will not hold a ligature. Both styptics and the cautery prevent primary union, and are only employed when no other means will answer. General oozing from a large surface or cavity can nearly always be checked by packing it with iodoform gauze.

The method most commonly used by surgeons for the arrest of hæmorrhage from an artery of any size is ligation. The artery is picked up by a pair of forceps, and a ligature tied firmly about it. A ligature should be about eighteen inches long. It was formerly made of strong, soft silk, but catgut is now employed in wounds which are to be completely closed, since the latter is absorbed and does not require to be removed. Test its strength well, so as to leave no chance of its breaking when strained; and, if you have it to tie, be sure and make a firm knot. Surgeons use generally the "reef knot," a square knot in which both ends of one string pass either over or under the loop made by the other; if the ends are separated by the loop, you get a "granny"

knot, which will slip. The string in the right hand should be held over the other in the first twist, and under it in the second, or *vice versa.* This knot may be made additionally secure, by making the second turn twice instead of once before drawing it tight—the so-called "surgeon's knot." You should practice these knots, and also the "clove hitch," which is often called for. For this,



make two loops in the cord from right to left, and put the first over the second. Loops in opposite directions will make, if they hitch at all, the much less reliable "cat's paw."

Another mode of arresting hæmorrhage, frequently employed, is that of torsion, the artery being seized in the forceps and twisted, rendering a ligature unnecessary. Still another way, though now rarely adopted, is by acupressure. A harelip pin is placed about the open mouth of the vessel, and a wire twisted over it in the shape of a figure 8.

There are, then, nine methods of arresting arterial

hæmorrhage: five—cold, heat, position, pressure, and styptics—which the nurse may employ at discretion; and four others—cauterization, ligation, torsion, and acupressure—which belong exclusively to the surgeon.

The most dangerous form of venous hæmorrhage is that from rupture of large varicose veins. Pressure should be made *below* the bleeding point, cold or heat applied, and the limb elevated. Pressure above the point of injury is here useless and absurd. Ligation is avoided, as it is likely to occasion inflammation of the vein. In cases where there is danger of such rupture, an elastic stocking or bandage should be worn, to support and make equable pressure upon the distended vessel. This should be put on before getting up in the morning.

Capillary hæmorrhage is never dangerous, and can easily be checked by cold and position, or by hot water, an especially valuable hæmostatic in such cases. It must be used as hot as it can be borne. Warm water will only increase the flow of blood.

There are some persons who have what is called the hæmorrhagic diathesis—that is, an excessive tendency to bleed—so that even a slight cut or scratch may be followed by hæmorrhage difficult to control. This is more common in male subjects, especially children. If such a case comes into your hands, you will probably have to resort to styptics. To stop the bleeding after a tooth has been extracted, a good application is a little piece of burnt alum pressed well into the cavity and packed down with lint.

The constitutional symptoms of extreme hæmorrhage are pallor, coldness of the extremities, clammy sweat, feeble or sighing respiration, small and rapid pulse, restlessness and thirst, vertigo, dimness of vision,

ringing in the ears, difficulty in articulation, followed, if the trouble is not before this brought to an end, by unconsciousness, slight convulsive movements, and death. The hæmorrhage usually ceases, or is much lessened, with syncope. The same effects follow internal hæmorrhage, and may be the only evidence of its existence, though usually the blood will somewhere find an outlet, unless the bleeding is intra-peritoneal. Convulsions may be the first conspicuous indication. A dangerous, often fatal, form of internal hæmorrhage results from the rupture of an extra-uterine pregnancy. Suspicion should be aroused if the patient has missed a menstrual period and complains of a sudden agonizing pain in the abdomen.

If blood comes from the lungs—*hæmoptysis*—it is usually coughed up, is bright red, and more or less frothy from the admixture of air. It is always a serious symptom, though the quantity of blood lost is rarely great; but blood supposed to be from the lungs is not infrequently from the mouth or throat.

The vomiting of blood, *hæmatemesis*, is usually somewhat less ominous. The patient is likely to have a sense of fullness and oppression in the epigastric region, and then to throw up, without much nausea, a large quantity of dark blood, mixed with food, but containing no air, acid in reaction, and incoagulable.

In either case, keep the patient quiet and cool, the head elevated. Give bits of ice, having them swallowed whole if possible; and if the hæmorrhage is repeated, apply ice-cold cloths externally. Give only fluid food, cold, and in small quantities.

In cases of internal hæmorrhage, particularly from the lungs, much may be done to arrest it by partially cutting off the venous return from the limbs, by means

of straps or bandages applied tightly around their proximal extremities. This procedure, by diminishing temporarily the amount of blood in the circulation, will diminish its force, and give an opportunity for coagula to form in the bleeding vessels. Ordinary shawl-straps will answer the purpose well. They should be applied to one arm and the opposite thigh, left in position for not more than five minutes, then removed, and the other arm and thigh similarly treated. This may be continued until the hæmorrhage ceases, alternating the sides, and taking off one pair of straps before putting on the others.

When an exhausting hæmorrhage has occurred, after its source has been controlled, the limbs may be tightly bandaged from their distal extremities to the trunk, in order to prevent the circulation in them of blood which is needed by the vital organs. The object in both the above procedures is to gain time. The same care must be taken not to leave the bandages on too long.

With hæmatemesis some blood will almost invariably appear in the next stool as a dark, tarry substance. For hæmorrhage from the bowels, ice-cold injections may be given, and in the same way solutions of vegetable astringents—as oak-bark, tannic acid, catechu, etc. Make cold applications over the abdomen. It may be well to give a small dose of opium to diminish the peristaltic action. This may occur in the course of typhoid or yellow fever, but is more common from hæmorrhoids than from any other cause.

With *hæmaturia*, keep the patient lying down, and give hot or ice-cold injections into the rectum or vagina. Blood in the urine may come either from the kidneys, bladder, or urethra. Note whether it appears at the beginning or end of micturition, and whether its pas-

sage is accompanied by pain. Blood from the kidneys is dark and clotted; from the bladder it is clear, as a rule.

In case of uterine hæmorrhage, especially when following operations, a vaginal douche of hot water, or a hot solution of alum, is especially indicated. The fluid extract of ergot, or gallic acid, may be given internally. It may be necessary to plug the vagina. One way of doing this is to introduce as far as the mouth of the uterus the center of a soft handkerchief, leaving the ends projecting. Pack this with small pieces of compressed sponge, gauze, or cotton, and tie the projecting ends together. Cotton is best, but not absorbent cotton. After a sufficient time the plugs can be removed, one at a time, and, finally, the handkerchief. Another way is by means of a kite-tail tampon—a series of bunches of cotton tied at intervals of a couple of inches along one string. These are introduced, one at a time, till the vagina is distended, and the end of the string left hanging. Upon pulling this, the plugs easily come out in succession. Ordinary lamp-wicking makes a good tampon. Hæmorrhage following childbirth is called *post-partum.* Special directions for its treatment are given in the chapter on obstetrics.

There is one other local hæmorrhage which demands some special attention—epistaxis, bleeding from the nose. This may be either the result of an accident or a spontaneous outbreak. In the latter case it may be looked upon as an effort of nature to relieve the head, and need seldom be regarded with any uneasiness. To check it, make pressure on the facial artery at the root of the nose, with cold applications to the forehead and back of the neck. The ordinary position taken—leaning over a basin—is the worst possible. Make the pa-

tient stand erect, throw his head back and elevate his arms, while you hold a cold, damp sponge to the nostrils. If the bleeding still persists beyond a reasonable time, the nostrils should be syringed with salt and water, ice cold (℥ j–O j), or a solution of alum or iron. There are very few cases that these measures will not control. Avoid blowing the nose, and so disturbing the formation of clots. If all other means fail, the surgeon may find it necessary to plug the nares. To do this, he will need a small flexible catheter, a strong cord, and some lint. The cord is passed through the eye of the catheter, and carried by it through the nostril to the pharynx, where the end of the string can be caught and brought out through the mouth. By means of this a plug of lint is drawn into the posterior naris; another is pushed into the anterior, and the two tied together so as to hold each other in place. They should be left in for twenty-four hours. The process is a very painful one, and is only resorted to when all other means prove ineffectual.

CHAPTER XIX.

Emergencies—General conduct in accidents—Shock—Syncope—Fractures — Dislocations — Sprains — Wounds — Bites and stings—What to do in case of fire—Burns—Foreign bodies in the eye, ear, nose, throat—Asphyxia—Artificial respiration—Sunstroke—Lightning—Freezing—Convulsions— Apoplexy—Other causes of insensibility—Poisons.

Some exceptional cases will arise, in which whatever is to be done must be done at once, without waiting for the arrival of skilled service, and in these emergencies, if a nurse is present, she will naturally be looked to in the place of a doctor. How much the nurse is justified in doing, it is difficult to say; it depends upon the case and upon the nurse. You will not wish to assume responsibilities that do not belong to you, but, when a doctor can not be at once obtained, prompt action on your part may save life. Do not try intricate experiments. Remember that the simplest things are often the most useful, and that it is usually safer to do too little than too much. As a rule, if you do not feel sure what ought to be done, do nothing. But if you have made any use of your opportunities, you will know at least more than the utterly uninstructed crowd. Now is a chance to practice the coolness and presence of mind which your training has led you to cultivate. Above all things do not get excited, or you will forget all that you would otherwise know.

In case of any accident, send a written message to the doctor, describing as well as you can the nature and urgency of the case, so that he may come prepared with the necessary appliances. A verbal message sent by an excited bystander is never delivered intelligently. Try to get rid of everybody who can not be made useful, so as to secure plenty of fresh air and room to work. If respiration is suspended, or the danger imminent, treatment must be begun at once, on the spot, without loss of time; otherwise the patient may be carried to the nearest convenient house. For this purpose, a stretcher, or something which will take its place, on which he can lie horizontally, should be provided. The bearers should be instructed to carry it in the hands, not on the shoulders, and to avoid unnecessary jolting. It is better for them not to keep step.

Have a warm bed ready to put him in. Remove the clothes with as little disturbance as may be, and do not cut anything that can be ripped. If a foot is hurt, the shoe and stocking will generally have to be sacrificed, but almost everything else can be ripped without ruining. Take the clothes from the sound side first, but in putting on a garment begin with the injured side. Special directions for undressing a woman are hardly needed; in case of a man, a point to be remembered is to unfasten the suspenders behind as well as in front. All the clothing can then be easily removed under cover of a sheet.

Severe injury of any kind may be followed by that complete prostration of the vital powers known as shock. The patient lies in an apathetic state, though not unconscious, the surface of the body pale and covered with cold perspiration. There will be an abnormally low temperature, feeble pulse, dilated nostrils, drooping lids, both

mental and muscular weakness, and, in less severe cases, nausea and vomiting. Death may be caused indirectly by failure to rally from this condition. Keep the patient's head low, and give stimulants till the heart's action is revived. Apply heat to the extremities and the pit of the stomach. Hot tea, coffee, or beef-tea may be given if it can be retained. When there is nausea, brandy is the best form of stimulant. If the patient can not swallow, inject brandy and camphorated oil hypodermatically.

Syncope, or fainting, manifests many of the same signs as shock, and mild forms of the latter are often confounded with it. There is unconsciousness, occasioned by an insufficient supply of blood to the brain. Do not raise the head; keep it as low as, or lower than, the feet; this position alone, with plenty of fresh air, will often restore consciousness. If the condition persists, proceed as in case of shock. Ammonia may be given by inhalation, but not too strong, as the irritation may occasion dangerous bronchitis.

Broken bones are among the most common casualties. It is a mistaken impression that a fracture must be set immediately. It will do less harm for it to be left a day or two without splints than for them to be awkwardly applied. Handle the injured part as little as possible, and do not attempt to do more than to keep the patient comfortable and quiet until a competent surgeon can be obtained. Temporary splints may be put on, made of pasteboard, shingles, or any smooth and stiff material at hand, to prevent the spasmodic twitching of the muscles, which adds to the pain. If it is a limb that is broken, place it in a natural position, making some extension, and support it firmly, elevating the limb slightly. A broken leg may be laid on a pillow, which is then bandaged closely around it, or it may be

bound to a straight padded stick, or even to the other leg. In fracture of the patella, the foot should be elevated to a considerable height, and the leg kept straight by a long splint at the back. Put a pad under the knee. For a fractured thigh, extend the limb and bind it against a splint long enough to reach from the axilla to the heel. With a broken arm, bend the elbow, keeping the thumb up, fasten a well-padded splint on each side, and place the arm in a sling. With a fractured clavicle, lay the patient on his back, without a pillow, with the arm of the injured side bound across the chest. For fractured ribs, keep the patient quiet in bed; put a broad bandage tightly around the chest to limit its movements; note whether any blood is raised. If skull fracture is suspected, keep the patient in a quiet, dark room, on his back, with the head slightly raised; apply cold cloths to the head. If blood or serum is oozing from the ears, do not let it putrefy, or it may set up an inflammation in the brain. Wash the external ear, and put in a little antiseptic pad. For fracture of the jaw, close the mouth, and fix in place with a bandage.

When a dislocation occurs, it is much more important for it to be speedily reduced, as the muscular tension increases and the reduction becomes more difficult with each hour that passes. There are one or two which you may try yourself to put in place. Dislocation of the jaw is one easily managed, and in which delay is particularly trying to the patient, as it will be fixed immovably, rendering him unable to speak. To reduce this, place the thumbs on the back teeth and the fingers under the jaw. Depress forcibly the angle of the jaw, at the same time lifting the chin. The thumbs need to be well protected, for the jaw will slip in place with

a snap, and unless they are quickly moved aside they may get badly bitten. Dislocations of the fingers can generally be reduced by forcibly pulling them. A thumb out of place is more difficult, sometimes impossible to return. Too much force should not be used in the attempt. Larger joints you will hardly dare to meddle with, owing to the difficulty of making a positive diagnosis and the danger of creating complications. After any dislocation the joint will for some time be weak, and liable to a recurrence of the accident, so that, when it has once been reduced, the parts should be firmly bandaged or strapped in place, until they have grown quite strong again.

Sprains occur most frequently at the wrist and ankle-joint. They should not be made light of, for, if neglected, their results may be permanent. Soak in hot water, and bandage with hot cloths. Complete rest is essential. Massage is useful later, and when the swelling goes down the joint should be supported by bandaging or strapping. A stiff bandage (silicate or plaster of Paris) furnishes the best support.

Contusions, or bruises, are best treated by rest and hot applications. After a general contusion a warm bath may be found helpful. Severe contusion is often followed by symptoms of shock. A painfully crushed finger or toe may be wrapped in soft cloths wet with hot water and a little laudanum. Do not use arnica or any of the strong patent liniments.

With contused and lacerated wounds there must be especial care in cleaning out the blood-clots. In the case of all wounds there are five points to be attended to: To arrest the hæmorrhage, to cleanse the wound, to bring the cut surfaces together, to see that there is a way of escape for any discharge, and to protect the wound

from the air. With all extensive wounds, especially those of the thoracic and abdominal cavities, rest is important. When the chest is injured, lay the patient on the wounded side rather than the other.

A ghastly effect is often produced by a wound which bleeds freely, but which, when it is cleansed, proves unimportant. This is apt to be the case with cuts about the head and face. In washing, do not touch the wound itself, but irrigate or squeeze a stream of antiseptic solution over it. When you are sure that no dirt or other foreign matter is left in it, bring the edges as nearly as you can to their original position; if the wound is but slight, they may be held in place by adhesive strips, leaving room between them for the escape of blood and pus. Over this put some simple dressing, to exclude the air. On the scalp, the hair must be cut or shaved off about the wound before the strips are applied. For a deep incision, or one that can not be held together by adhesive plaster surgeons use sutures of silk, catgut, or fine wire. To introduce these, a needle with a cutting edge is required. A cut finger needs only to have the edges brought snugly together and bandaged. For slight wounds on the face, collodion is sometimes used in place of plaster after the bleeding is checked. This is a solution of gun-cotton in ether. When applied, the ether evaporates, leaving an adhesive, transparent, and highly contractile film. One layer only is to be used, as it contracts so forcibly that a second will drag off the first. The parts must be held together until it is dry. It is useless to apply it over a wet surface. If a finger, a portion of the scalp, or any small part is almost entirely cut off, there is still a chance of its growing on again, if it is cleaned, immediately replaced in the proper position, and so bound on that a firm and even pressure is made.

The experiment is at least worth trying, for even if it fails there is no great harm done.

With a punctured wound, the important point is to keep it open until it heals from the bottom. If made by a splinter or thorn, this must be entirely removed, not by poking at it, but by making a sharp incision along its course, so that you can get at and withdraw it. The incision, though it seems like increasing the wound, is likely to heal sooner and better than the puncture. If the splinter goes under the finger-nail, trim or split the nail down to the end of the splinter.

Never try to extract a fish-hook or any barbed instrument by the hole at which it entered. Push it all the way through and break off the head.

In case of the bite of a venomous snake or other probably poisoned wound, the bleeding should be encouraged rather than checked. Bathe it in warm water. Ligate the limb, if possible, above the point of injury, and suck it, or apply cupping-glasses, before absorption takes place. If the heart's action seems affected, keep the patient lying down, and give stimulants to the verge of intoxication. Ammonia-water may be used both externally and internally. Cauterize the wound deeply, and then poultice it. Prompt excision of the wounded area has been recommended. The bite of any animal may be regarded with suspicion. That of the cat or rat is said to be more dangerous than that of the dog. Treat the bites and stings of insects with cool lotions. For the mosquito-bite, use ammonia or salt. Take care that the sting of a wasp or bee is not left in the wound, as it may set up serious irritation. A good way to remove it is to make strong pressure around the spot with the barrel of a watch-key.

The eruption from the *Rhus toxicodendron* (poison

ivy) or the *Rhus venenata* (poison oak, or sumach) may be treated with a saturated solution of bicarbonate of soda. These two are the only plants poisonous to the touch likely to be encountered in this part of the country.

Perhaps the most alarming accidents are those resulting from fire. If your own clothes catch fire, lie down on the floor and roll, keeping your mouth shut. If you see another woman in the same danger—it is most likely to be a woman—throw her down, and wrap around her a shawl, rug, or any heavy woolen thing at hand, to stifle the flames. Begin at the head, and keep the fire as much as possible from the face. The great danger is that of inhaling the flames.

In the treatment of burns or scalds, the first object is to exclude the air. This will at once allay the pain. If the injury is superficial, mere reddening of the surface, sprinkle it thickly with bicarbonate of soda and tie a wet bandage over it till the pain subsides. Then the part may be protected from the action of the air by painting it over with the white of an egg. As one layer dries, a second and third may be added. Flexile collodion, similarly applied, is even better, but it is not one of the things likely to be at hand in an emergency. Another plan is to dust with flour and cover with a thick layer of cotton-wool. If the burn is severe enough to have blistered or destroyed the cuticle, the latter remedy should not be employed, for the discharge will harden the flour into crusts, and the fibres of the cotton stick to the wound, and can not be detached without pain. Carron oil—linseed oil and lime water in equal parts—is a popular remedy, but pure olive oil or vaseline is as good, or perhaps better, as linseed-oil often contains irritating impurities. From severe burns great deformity some-

times results, through the contraction of the skin in healing. It may be quite unavoidable, but something can be done toward preventing it, by keeping the burned parts in the best position, not always the easiest. A severe burn is usually accompanied by more or less shock, to be treated according to the directions already given.

The burns produced by strong acids are treated in the same way as those by fire, further caustic action being prevented by first bathing with some weak alkaline solution, as of soda or ammonia. Common earth, picked up almost anywhere, contains alkali enough to be useful.

Lime or caustic potash may make a severe burn. The treatment is still the same, the alkali being first neutralized by some acid, as diluted vinegar or lemon juice, about a teaspoonful to a cup of water.

If a fragment of lime gets into the eye, bathe it at once with such a solution, without wasting time in trying to pick it out. Any foreign body in the eye will occasion a great deal of pain. The irritation gives rise to an abundant secretion of tears, which will sometimes wash out the cause of trouble. Dust or small cinders may be cleared out by drawing the upper lid well down over the lower, and at the same time blowing the nose forcibly. If a particle gets caught under the lower lid, draw it down by the lashes, direct the patient to turn the eyeball toward the nose, and the offending body can then be wiped out with a soft handkerchief. If it is under the upper lid, that can be turned up over a knitting-needle, or a small pencil, and treated in the same way. Always wipe the eye toward the nose, as the natural secretions flow in that direction. If the particle is imbedded in the surface of the eyeball, it

will have to be picked out by a sharp instrument. It takes a surgeon to do this safely.

Foreign bodies in the ear are often very troublesome. If an insect gets in, lay the sufferer down on the other side, straighten the tube of the ear by pulling the tip upward and slightly backward, and fill it with warm olive oil or glycerin. The insect will be drowned in this and float to the surface. If some hard substance is in the ear, hold it downward and syringe gently with warm water, taking care not to close the opening with the nozzle of the syringe. Do not try this if the object is anything that will swell with moisture, as a bean or a pea, as it will then only make a bad matter worse. Neither poke at it, as it may be easily driven in beyond reach. Get a doctor as soon as possible, as permanent injury to the ear may result if the obstruction is not removed.

When a foreign body is in the nostril, make the patient take a full breath, then close the mouth and the other nostril firmly, when the air, having no other way of escape, may expel the obstruction. If this fails, and the object is in sight, compress the nostrils above to prevent its being pushed farther up, and hook it out with a hair-pin or a bent wire.

Anything stuck in the throat, or œsophagus, may sometimes be hooked out in the same way, if it is too far down to be reached by the fingers. A pair of blunt scissors may be used in the place of forceps. It is hardly safe to try, as is often advised, to push the object down, unless it is some digestible substance which may be trusted to soften under the action of the secretions. If a piece of bread can be swallowed, it may carry down with it the obstruction. Once swallowed, there need be no further apprehension on account of the size of the body, as whatever will pass through the gullet will get

through the rest of the alimentary canal without difficulty. Do not give purgative medicine in such case, but food a little more solid than usual, in which it will be imbedded and carried along without irritating the passages.

A foreign body in the windpipe will usually be expelled by the coughing which its presence excites. The trachea is very sensitive, and the entrance even of a drop of water excites great irritation. A blow on the back will be of use if the person is choking. A child may be taken up by the feet and held head down while a succession of blows are administered between the shoulders. This will seldom fail to dislodge the object unless it has been sucked deeply into the air passages.

If the trachea is so obstructed, from any cause, that the supply of air is cut off from the lungs, and the blood fails to be oxygenated, asphyxia results. This is what occurs in drowning, strangulation, and suffocation by irrespirable gases. The action of the lungs may under such circumstances have ceased some time before death ensues, and, even when animation is too far suspended for the movements of the chest to be of themselves renewed, the lungs may sometimes be forced into action by artificial respiration. There are two methods commonly employed; the most practiced is that known as "Sylvester's ready method." The first thing to be done is to pull the tongue forward and keep it there, so that it will not fall back and obstruct the trachea; an elastic band over the tongue and under the chin is advised for this purpose. Loosen all the clothing, and lay the patient on his back, with head and shoulders slightly raised. Then, standing behind him, grasp the arms just above the elbows, and draw them slowly away from the sides of the body in an upward direction till they

meet over his head. Hold them in this position for about two seconds, then bring them back slowly till the elbows meet over the chest, making some pressure. With the first motion the ribs are raised by the pectoral muscles, and a vacuum is created in the lungs, into which the air rushes. As the arms are brought back to the sides, the air is again forced out, as in natural respiration. The two movements should be repeated slowly and steadily, not more than sixteen times in a minute, and persisted in until respiration takes place naturally, or until all hope of establishing it must be given up. It is not to be considered hopeless under two hours.

"Marshall Hall's method" is sometimes used as a substitute for or alternating with Sylvester's. The body is laid flat on the face, and gentle pressure made on the back, after which it is turned over on the side; then again on the face, and the pressure reapplied. Repeat these motions at a rate of sixteen to the minute. The principle is the same, whichever method is adopted. It is well to practice one or both of them, that the motions may be familiar if suddenly called for. Cessation of breath for more than two minutes is usually fatal.

When a person is apparently drowned, before beginning artificial respiration, turn the face down for a moment, and clean out with the finger any accumulation of mucus that may be at the base of the tongue. The same must be done in case of strangulation. Remove all constriction from the neck. If hanging, cut the body down, but do not let it fall. In poisoning from carbonic-acid gas (choke damp) or carbonic oxide (the fumes of burning charcoal), loosen the clothing, and, if the body is still warm, dash cold water over it forcibly and frequently. If it is chilled, use hot applications instead.

In all these cases employ artificial respiration, and give stimulants and nourishment as soon as they can be swallowed.

Sunstroke or heat prostration is in most cases preceded by headache, dizziness, and more or less mental disturbance. Direct exposure to the rays of the sun is not essential; it may be produced by intense heat of any kind. Fatigue and foul air aggravate the tendency. Persons who have once been so affected are liable to a recurrence of the attack upon exposure to heat. The preliminary symptoms either become intensified until delirium sets in, or the patient falls suddenly unconscious, the face pale or dusky, the skin very hot, the breathing evidently difficult, and the pulse weak and fluttering. There are occasionally convulsions, but more often no movement after the first insensibility till death. The danger is imminent, the bodily temperature sometimes rising to 112° or 114°. The first thing to be done is to reduce this. Remove the patient into the shade, take the clothing from the head and chest, and throw cold water over the body, or put it in a cold bath, gradually reducing the degree of cold. Have all the fresh air possible, and as soon as a decline in heat is evident, artificial respiration may be resorted to, if necessary. If, after consciousness is restored, the temperature again rises, the cold applications must be repeated. Do not give alcoholic stimulants without medical advice. Aromatic spirits of ammonia may be used if a stimulant seems called for.

When death takes place from a stroke of lightning, it is the result of shock to the nervous system. This may be enough to produce unconsciousness without being fatal, and, even when life is apparently extinct, an effort at resuscitation should be made. Employ artificial

respiration, and treat otherwise as directed for shock. The principal lesions may be burns, which need the same attention as burns from any other source.

Any one suffering from the effects of severe cold must be kept away from the heat, as there will otherwise be danger of sloughing of the frost-bitten parts. A person found frozen should be taken to a cold room, undressed, and rubbed with snow, or cloths wrung out in ice-water. The friction should be continued, especially about the extremities, until the circulation seems restored; at the same time artificial respiration may be resorted to if the natural is at a stand-still. Give brandy and beef-tea as soon as the patient is able to swallow. Only by degrees bring him into warmer air. The same plan is pursued with any frost-bitten part, the aim being to restore vitality without inducing sloughing. Parts of the body may be frozen without the sufferer's knowledge, as numbness and insensibility precede the later stages.

With a tendency to chilblains, cold feet should not be too quickly heated. They should be warmly and always *loosely* clad. In the early stages, painting them with iodine will relieve the itching. If neglected, they may develop painful and intractable ulcers.

Hernia, rupture of the peritonæum, with protrusion of the abdominal contents, takes place either in the groin, the lower front of the abdomen, or at the umbilicus. The tumor most often contains a loop of small intestine. The symptoms are intense pain, obstinate constipation, and persistent, sometimes stercoraceous vomiting. Put an ice-bag over the swelling, give no food, no physic. very little drink, and send at once for a surgeon, as prompt operative measures may be necessary.

Convulsions in the adult are most commonly either

from epilepsy or hysteria. An epileptic seizure may be distinguished from fainting—syncope—by the convulsive movements, which are absent in the latter. The patient falls with sudden loss of consciousness, and often with a peculiar sharp cry. The face is at first pale, but may afterward become flushed; there is frothing at the mouth, with jerking motions of the whole body or parts of it. This stage only lasts a few moments, after which the patient may recover consciousness or lapse into stupor. The only treatment is to keep the patient from hurting himself during the convulsions. Lay him on the back, the head slightly elevated; loosen the clothing, and allow plenty of fresh air. Insert a folded towel between the teeth, to keep him from biting his tongue. Give no fluid. These attacks are in some subjects preceded by warning sensations of varying character, known as the "aura." When the aura begins in a hand or foot, tying a tight ligature around the limb above may sometimes abort the attack. Confirmed epileptics are usually in an impaired mental condition, and occasionally these seizures are followed by acute mania.

Hysterical fits, most common in young girls, may be much the same in appearance, but the patient is not really unconscious, and never hurts herself. Any effort to open the eyelids will usually be resisted, and the eyeball will be found sensitive, as it is not in epilepsy. There is so little treatment needed in either case that it is of little account whether or not you are sure which it is. Keep the patient quiet, and free from sympathetic spectators. The mere suggestion of some disagreeable remedy will often terminate the seizure. It may be followed by the involuntary passage of a large amount of pale urine.

In apoplexy there are rarely convulsions. There is

sudden loss of consciousness, without heart failure, the face is flushed or, more rarely, very pale, the respiration stertorous, the pulse slow and full, the temperature at first lowered, the pupils fixed and one or both dilated, with paralysis of one side. There may be retention or involuntary passage of urine. The patient should be moved no more than is absolutely necessary. Loosen the clothes, elevate the head and chest, apply cold to the head and warmth to the extremities. Act on the bowels, but do not give stimulants or emetics. Apoplexy is likely to be confounded with intoxication, especially when the patient has recently been taking liquor and carries the odor of it in his breath. In an intoxicated subject the pupils are evenly dilated, and the stertorous breathing is absent. He can generally be roused, though he sinks back again into stupor. The temperature is likely to be two or three degrees below normal. Lay the patient on the side, the head somewhat elevated, and induce vomiting.

A person found insensible may be suffering from one of these affections, from concussion or compression of the brain following injury to the head, or from narcotic poisoning. In all cases, keep the head cool and the feet warm, and get medical advice as soon as possible.

Poisons may be classified as *irritant*, those destroying the tissues with which they come in contact, producing death by shock to the nervous system; *narcotic*, those producing insensibility and death by their action on the brain, without local effect; and *acro-narcotic*, those which combine the action of the other two. Treatment has three things in view: to remove the injurious substance, neutralize its further action, and remedy such ill effects as it may have already produced. The stomach is to be evacuated by emetics. You will be able to get

nearly everywhere, at short notice, warm water and salt, or ground mustard, either of which is an excellent emetic. Stir up a tablespoonful in a cup of the warm water, and give repeatedly. The same quantity of wine of ipecac in water, or sulphate of zinc, twenty grains at a time, may be given. Tickling the back of the throat with the finger or a feather will sometimes induce emesis. Emetics should be condensed and frequent. Half a pint to a pint at a time is enough. Too large a quantity may distend the stomach to the point of paralyzing the muscular walls, and too dilute solutions will act as purgatives instead of emetics. It may be desirable in some cases, after the stomach has been cleared, to evacuate the bowels also, as some of the poison may have passed into them. Do not stop to dissolve emetics fully, but stir them up in water and give as quickly as possible. After any irritant poison give some bland fluid to soothe the injured parts. White of egg, milk, mucilage and water, flour and water, gruel, olive or castor oil, may be used. Oil must not be given in case of poisoning by phosphorus or cantharides. For all the acids, alkalies are the chemical antidote, and *vice versa*. The antidote to a poison is either chemical, uniting with it to form a harmless compound, or physiological, correcting its effects upon the system.

THE MORE COMMON POISONS, THEIR SYMPTOMS, ANTIDOTES, AND TREATMENT.

Poisons.	Symptoms.	Antidotes and Treatment.
Acids. Acetic. Citric. Muriatic. Nitric. Oxalic. Sulphuric. Tartaric.	All highly corrosive, excoriating the parts with which they come in contact, occasioning intense pain, followed by symptoms of shock. Nitric acid makes yellow stains; sulphuric blackens.	For nitric and oxalic acids, the carbonate of magnesia or lime; for sulphuric acid, strong soapsuds; for oxalic, lime water; for the others, any dilute alkali. Induce vomiting, give demulcent drinks, and treat the consequent inflammation and shock as if from any other injury.
Carbolic.	Caustic; whitening of the mucous membrane, with intense burning and numbness, nausea, weakness, stupor, and collapse.	Oil, milk. Secure rest, warmth of the body, and stimulation.
Prussic.	Gives an odor of peach kernels; nausea, giddiness, pain in the head, convulsions and death.	Dilute ammonia. Cold affusion to the spine, emetics, and stimulants. A fatal dose leaves scarcely time for any treatment, death occurring in from three to five minutes.
Alkalies and Earths. Ammonia. Baryta. Lime. Potash. Soda.	Violent caustics, causing destruction of the mucous membrane, acute burning pain, vomiting and purging of bloody matter, and death by shock.	The vegetable acids — dilute vinegar, lemon-juice, etc —neutralize them. The fixed oils — castor, linseed, olive, etc.—unite with them to form harmless soaps. Give these, and demulcent drinks; stimulants, if necessary.

THE MORE COMMON POISONS, THEIR SYMPTOMS, ANTIDOTES, AND TREATMENT—(*Continued*).

Poisons.	Symptoms.	Antidotes and Treatment.
Metallic Irritants.		
Antimony. *Tartar Emetic.*	Symptoms like those of cholera; violent cramps and purging, collapse; inflammation of whole alimentary canal, with metallic taste, suppression of urine, vomiting, cramps, delirium or stupor, death.	Induce vomiting, if the poison has not already done so, and give astringent infusions, as of strong tea or oak bark.
Arsenic. *Paris Green.* *Scheele's Green.* *Fowler's Solut.*	Intense pain, thirst, vomiting and purging, tenesmus, suppression of urine, clammy sweat, delirium or collapse, and death either in a few hours from shock, or after several days from inflammation.	The hydrated sesquioxide of iron—prepared by adding ammonia to the common muriated tincture, and washing the precipitate—is the antidote. Give *ad lib.* Or dialyzed iron and magnesia, half an ounce of each every ten minutes. After Fowler's solution, give lime-water freely, evacuate the stomach, and give demulcents.
Bismuth. Copper. *Blue Vitriol.* *Verdigris.*	Symptoms like other irritants.	Emetics, milk, albumin, and mucilaginous drinks.
Iodine. Iron. *Copperas.*		Starch unites with iodine, forming an insoluble compound, but not with the iodide of potassium.
Lead.	May occasion paralysis.	
Mercury. *Corrosive Sub.* *Vermilion.*		Albumin in some form, preferably the white of eggs, milk, flour gruel.

Phosphorus.		Emetics, mucilage, and magnesia. No oil.
Silver, *Nitrate of.*		May be decomposed by common salt.
Tin. Zinc. *White Vitriol.*		Carbonate of soda in solution, milk and albumin.
VEGETABLE IRRITANTS Colocynth. Croton Oil. Savin Oil.	Violent vomiting, diarrhœa, and pain, thirst and constriction of the throat, difficult breathing, delirium or stupor, death.	Evacuate the stomach and bowels as promptly as possible, and stimulate.
ANIMAL IRRITANTS. Cantharides.	Severe pain and burning all through the alimentary canal, bloody evacuations, strangury or retention of urine, convulsions, delirium, death.	Excite vomiting, give emollient drinks and enemata, but no oil. Rub the abdomen with camphor, or camphorated oil to relieve the strangury.
Poisonous fish.	Indigestion, headache, vertigo, thirst, vomiting and diarrhœa, collapse. Often an eruption on the skin.	Emetics, purgatives, and stimulants.
NARCOTICS and ACRO-NARCOTICS. Aconite. Alcohol. Belladonna (*Nightshade*). Camphor. Chloral. Colchicum. Conium (*Hemlock*). Digitalis (*Foxglove*).	These are nearly all vegetable poisons. They occasion nausea, numbness, stupor, delirium or convulsions, overstimulation of the heart, followed by its failure, insensibility, coma, death. With the acro-narcotics, these symptoms are preceded by those of irritants, an acrid taste, dryness, and constriction of the mouth and throat, fever, vomiting and diarrhœa, with intestinal pain. The pupils of the eyes are usually di-	Evacuate the stomach as thoroughly as possible, and give active purgatives; give strong coffee and keep the patient roused. The custom of walking the patient up and down, and slapping with wet towels, is objectionable; it adds exhaustion to depression, and risks giving him pneumonia. Keep him in the recumbent position, and employ friction, and, if necessary, artificial respiration.

THE MORE COMMON POISONS, THEIR SYMPTOMS, ANTIDOTES, AND TREATMENT.

Poisons.	Symptoms.	Antidotes and Treatment.
Dulcamara (*Bitter-sweet*). Ergot. Hellebore. Hyoscyamus. Laburnum. Lobelia. Nux Vomica.	lated, except under opiates, which contract them. Belladonna dilates them widely.	
Strychnine. Physostigma. Opium.	Strychnia excites violent convulsions, like those of tetanus.	The spasms may be quieted by inhalation of ether.
Morphine. Tobacco. Toadstools. Turpentine.		
GASES. Carbonic acid. Carbonic oxide. Nitrous oxide. Sulphuretted hydrogen. Chlorine. Chloroform.	Chlorine violently irritates the respiratory organs; the others act like narcotics. Each has a certain characteristic odor, by which it may be recognized.	Give plenty of fresh air, cautious inhalations of ammonia, stimulants, and artificial respiration, if necessary.

CHAPTER XX.

Gynæcological cases—Conduct of examinations, digital and instrumental — Specula — Tampons — Local medication — Douches —Care of abortion cases—of operations for lacerated cervix and perinæum.

A LARGE proportion of the cases coming under the care of a nurse are those of disorders of the female reproductive organism, classed as gynæcological. These are sadly common, various, and often complicated. Many of them might be prevented by greater general knowledge and attention to the hygiene of these organs. Happily ignorance of her own anatomy is no longer regarded as essential to a woman's refinement, and it becomes every nurse at least to understand something of the anatomy of the genital organs, external and internal, their physiology and function, and the normal processes of menstruation, ovulation, and fecundation.

In pathological conditions, the first important thing for the nurse to understand is the method of physical examination of the pelvic organs, and what assistance the physician may require. For a merely digital examination, little will be needed beyond your presence and attention to wait upon the doctor as he may desire. Never leave a doctor alone with a gynæcological patient except at his own request. If you have opportunity to prepare the patient for examination, the important

thing is to see that the rectum is empty and the external genitals clean.

An instrumental examination may be made with the patient in the dorsal, knee-chest, or lateral position. Getting the patient properly posed is the duty of the nurse.

In the dorsal position, the patient lies flat on her back, with her knees elevated. The knee-chest position is the exact reverse, hips elevated, weight resting on the knees, the chest flat against the table, not supported by the elbows. The third and most common is known as the Sims position. The patient lies on the left side, with the left buttock on the extreme left corner of the table, the left arm behind her, and the knees drawn up, the right above the left. The head and right arm come well to the right side of the table, the right shoulder as much depressed as possible. This attitude, with the aid of the Sims speculum, gives the most complete view of the vagina and uterus, and is the best suited for operations on the cervix and anterior vaginal wall. The cylindrical and the bivalve specula are more commonly used with the patient in the dorsal decubitus. Whatever position is taken, the patient should be protected from any unnecessary exposure. The vulva only should be in view, a light blanket or a sheet placed lengthwise, covering each leg separately. In placing a subject in the dorsal position, the nurse should herself raise the knees to avoid any strain on the part of the patient, and for the same reason should not let her rise from it without first turning on the side.

The speculum is prepared for use by dipping it for an instant in hot water to warm it, and then oiling the outer surface. The Sims speculum must be held in position by the nurse. The usual way of doing this is

to stand behind the patient, facing the operator. Stand firm on both feet in an attitude that you can maintain steadily for a long time if necessary. Pass the left arm over the patient's hips, and with the left hand raise the right buttock, and, if desired, separate the labia. The right arm may rest on your own hip to steady it, while the right hand retains the speculum in the exact position, and with the same degree of tension, in which it is handed to you. Other instruments in use for these cases are the depressor, sound, probe, tenaculum, curette, uterine dressing forceps, applicator, cotton holders, dilators, and pessaries, with all of which you want to be familiar. Dilators are used for stretching the cervical canal, pessaries to hold in position a displaced uterus. If you should be directed to remove a pessary, remember that it must first be turned round so that its long axis will be coincident with that of the vagina. Various tampons and other local dressings are commonly employed in the treatment of uterine cases, for the preparation of which each doctor will give his own directions. The ordinary tampon is made by cutting a strip of absorbent cotton about three inches wide, and rolling it up, not too tightly, until it has a diameter of about an inch and a half. Tie a piece of twine or stout thread firmly about the middle of this, leaving an end of at least six inches hanging, for convenience in removal. These are used to keep the parts in proper position, and to apply medication. The "butterfly" tampon is a thin, flat piece of cotton with a string similarly tied about the middle. The "kite-tail" tampon is a series of bunches of cotton tied at intervals of two or three inches along one string. This form is much used in case of uterine hæmorrhage, and should be at hand when there is danger of such.

When a uterine examination is to be made, the tampons should be prepared beforehand. Applicators have bits of cotton twisted tightly on their tips, and little balls or squares of cotton will also be wanted to swab out the vagina.

Vaginal medication is also applied by means of suppositories and douches. The latter is a mode of treatment which the nurse will most frequently have to give. The douche may be either medicated or of pure water, as directed. The latter, when tepid, is simply for cleanliness, but the hot douche has a distinct therapeutic effect on congested or inflamed pelvic tissues. At first the congestion is increased, but a continued application of the hot water causes a secondary and more or less lasting contraction of the blood-vessels. Thus it is an excellent hæmostatic in all forms of capillary hæmorrhage. It also induces uterine contractions, and acts to a certain extent as a local anodyne. Hot douches should be of 112° to 118° F., and are usually ordered as prolonged douches, from two to four quarts being given. The patient should lie on the back, with the hips elevated until they are several inches higher than the shoulders. A douche taken sitting or standing is of very limited utility. A bedpan with an overflow pipe is needed. The fountain syringe is now chiefly used, as most doctors consider the steady flow under low pressure as preferable to the intermittent action of the Davidson. It should be suspended from a considerable height, to give good force to the flow. The long nozzle of the syringe is used, and should be well introduced, that the hot water may come in direct contact with the highest portions of the vagina. It should be carefully slid along the posterior vaginal wall until it has reached a point behind the cervix, before the water is injected. Any medication ordered

should be included in the last quart. Care must be taken that the mucous membrane is not blistered by the hot tube. For this reason ivory or hard-rubber nozzles are preferable to those of metal. For operation cases some surgeons prefer those of glass, as more perfectly aseptic. The tube should not be perforated at the immediate extremity, as there is danger of injecting the fluid into the cavity of the uterus, and doing serious harm, especially after confinement or miscarriage, when the mouth of the uterus remains open. In these cases it is not advisable to leave the patient alone with a fountain syringe in operation, as if the water all runs out, dangerous consequences may follow the injection of air into the uterus.

Cases of miscarriage often require careful nursing to prevent permanent ill effects. The first indication of an approaching abortion is hæmorrhage from the uterus, generally accompanied by pain. The patient should at once be put to bed, as the threatened miscarriage may in some cases be averted by rest and quiet. If this can not be done, care must be taken that the placenta and its membranes, the secundines, are all expelled as well as the fœtus, as their retention may occasion dangerous hæmorrhage or blood-poisoning. The patient should have as much care after a miscarriage as after labor at full term, being allowed in no way to exert herself. It is a great mistake to regard it as of slight importance; the loss of blood is often excessive, and the shock to the nervous system is greater than that produced by regular labor. The one is a natural, the other a pathological, process. A season of perfect rest is necessary to allow the uterus to return to its natural state. Miscarriage is more common among multiparæ, women who have borne children, than among primiparæ, those who bear for the first time.

After it has occurred a few times a predisposition to it exists, and it becomes difficult to carry a child to full term.

The most common gynæcological operations are those for lacerations of the cervix or the perinæum, both injuries consequent upon childbirth. The same general rules apply in all minor operations. In the preparation of the patient the previous condition of the bowels and the character of any vaginal discharge must be carefully noted and reported. At least six hours previous to operation an enema should be administered, that the rectum may be emptied and become quiet. The patient should be given a thorough bath and an antiseptic vaginal douche, 1–5,000 bichloride of mercury being commonly ordered. For perineal operations you may be directed to shave the parts. Have a T-bandage ready for use if required. After a cervix operation, obtain from the surgeon definite directions about emptying the bladder. Of course all orders in regard to diet, medication, and position must be scrupulously carried out. After an operation on the perineum it has been customary for the patient's knees to be tied together, that no unconscious movement on her part may bring a strain upon the stitches. The perineal wound ought to heal by first intention, and if the stitches are pulled upon so as to cut, even if they are not torn out, this desirable result will be hindered. The treatment consists of rest and the maintenance of absolute cleanliness. The success or failure of the operation depends here largely upon the nurse, as a little careless manipulation on her part may render useless the best skill of the surgeon.

If the patient is allowed to pass urine voluntarily, the sutured parts must be gently irrigated and dried after each micturition. If the patient is catheterized,

watch that no inadvertent drop falls upon the wound. A piece of absorbent cotton between it and the catheter will be found a great protection. During defecation, also, the nurse must see that no undue strain is allowed upon the stitches. It may be necessary, especially if the laceration has been through the sphincter, to support the perineum with the hand during the passage of fæces. In these cases, also, the rectum must be washed out after each movement. In all manipulations the utmost gentleness and care must be exercised, and the most scrupulous cleanliness preserved until the stitches are removed, which will be in about nine days.

In cases of laceration through the sphincter, and also of abdominal section, it is desirable to have the patient under observation and treatment for several days preceding the operation, and the diet restricted to such articles as leave but little solid residue in the intestinal canal. By far the greatest number of laparotomies are performed upon female subjects, and for the relief of conditions peculiar to their sex. The care of these cases has been already described.

CHAPTER XXI.

Obstetric emergencies—Utero-gestation—Symptoms of pregnancy—Abortion—Parturition—The three stages of labor—The conduct of each—How to treat the child, the placenta, the mother—Lactation—Care of the mother during the puerperal state—Dangers of the puerperal state.

It is perhaps more often in obstetric cases than in any others that the nurse will be called upon to assume, in his absence, the responsibilities properly belonging to the physician. It may happen that she will be obliged to deliver the child before medical aid can arrive, and a nurse who undertakes this branch of the work should at least know how to conduct a normal case without direction, for the lives of both mother and child may depend upon her skill and promptness. In order to be prepared for such an occasion should it arise, it is necessary for her to possess a much fuller knowledge of midwifery than she will ordinarily be called upon to put into practice. The following instructions need to be preceded by a more thorough acquaintance with pelvic anatomy and physiology than can be given here.

The development of an embryo in the uterus is known as pregnancy, or utero-gestation. During this condition the uterus becomes enlarged, rises out of the pelvis, and occupies the abdominal cavity. Other physical signs are suppression of the menses, enlargement of

the breasts and the presence of milk in them, and movements of the fœtus. Milk is sometimes found in the breasts as early as the second month. This is pretty reliable evidence of pregnancy, especially if it occurs in a woman who has not borne children. The mammary glands are so intimately connected with the reproductive organs as to be usually classed among them. During pregnancy they become swollen and tender, the veins enlarge, and the circles or areolæ about the nipples become discolored. The papillæ around the nipple become prominent. Swelling of the feet is not uncommon, with enlargement of the veins of the legs. When there is much œdema of the legs the urine should be tested for albumin, and if it is found to be present in any quantity the physician should be informed. Bladder disturbances—as retention or incontinence of urine—are not uncommon. A leucorrhœal discharge may be present. Constipation, diarrhœa, and other disturbances of digestion may be looked for. Nausea, particularly distressing in the morning when the patient first assumes the erect posture, and thence called "the morning sickness," is common in the early stage of pregnancy. There may be at the same time an abnormal appetite. Salivation sometimes occurs. During the fifth month the movements of the fœtus usually begin to be felt by the mother. By this time the uterus has risen above the brim of the pelvis, and the nausea may be expected to subside. Many nervous manifestations may accompany pregnancy — as insomnia, irritability, neuralgia, headaches, toothaches, etc. A cough is common, and in the later stages dyspnœa, arising from pressure upon the lungs. None of all these symptoms occurring singly has any diagnostic value, nor is the absence of them to be counted as negative proof; but when they are found

together they afford strong presumptive evidence of pregnancy. Still, a spurious pregnancy will sometimes manifest all of the subjective and even some of the objective symptoms. Perhaps the only positive tests are ballottement and auscultation of the fœtal heart. Ballottement consists in displacing the fœtus by a push of the examining finger, against which it rebounds with some force, and is recognizable to the practised touch. It may be performed either externally or internally. The beating of the fœtal heart will usually be audible by the fifth month through the stethoscope. It is very rapid — one hundred and thirty or one hundred and forty beats per minute—and so readily distinguished from the maternal pulse. When these sounds can be clearly heard, there can be no doubt of the presence of a living child.

During its intra-uterine existence the embryo, or fœtus, is contained in a sac—the amnion—which secretes the watery amniotic fluid in which the fœtus floats. The fœtus is connected with the uterine wall by the placenta and the funis, or umbilical cord. Through these it receives its nutriment from the mother.

At the end of nine months the embryo is fully developed, and is expelled from the uterine cavity, the process being known as labor, or parturition. If such expulsion occurs before the embryo is capable of maintaining an independent existence—that is, earlier than the seventh month—it is known as abortion or miscarriage; if later than this period, but before the end of the ninth month, it is called premature labor.

The full duration of pregnancy is 280 days, although it may be prolonged to 300. The usual rule for calculating the date of its probable termination is to add nine months and seven days to the date when menstrua-

tion last began. This is not always reliable, but is based on the theory that conception is most likely to have taken place just after the close of the menstrual period. The approach of labor is heralded by certain preliminary symptoms. During the last two weeks the abdomen diminishes in size, the uterus sinking down into the pelvis. The pressure upon the lungs gradually becomes less, so that the difficulty of breathing is removed, but there is increased pressure upon the bladder and rectum, occasioning frequent evacuations. Uterine contractions begin to be felt, and are finally attended by pains. True labor pains come on at regular intervals, increasing in intensity, and are usually first felt in the back. False pains are chiefly in front, and are short and irregular. They do not aid at all in the labor, but usually result from indigestion or an overloaded state of the bowels. A dose of castor oil will clear the intestines and probably relieve false pains, but violent purgation may precipitate the real labor. With the coming on of true pains there is often a discharge of blood and mucus, sometimes called the "show."

There are three distinct stages of labor. The first is the stage of dilatation of the cervix, terminating with the rupture of the "bag of waters." This bag is formed by the pressure of the contracting uterus upon the membranes containing the amniotic fluid, and by the same means is forced through the cervical canal, thus dilating it. This is what takes place during a pain. In the intervals between the pains, the uterus relaxes, the amniotic bag becomes less tense, and the position of the child may be made out through its walls. When the os is sufficiently dilated the bag usually bursts and the amniotic fluid gushes out. This terminates the first stage of labor.

The second stage includes the passage of the child along the pelvic canal, and is concluded by its delivery. After the membranes have ruptured and the fluid has escaped, the uterus contracts directly upon the child more and more strongly, forcing it toward the pelvic outlet, the point of least resistance. Each pain is now accompanied by a strong impulse to bear down, which aids in the expulsion of the fœtus.

After this is accomplished there still remains the third stage, during which the uterus contracts upon the placenta, detaching it from the uterine surface and pushing it out also. The expulsion of the placenta ends the third and final stage of labor, and the woman now enters upon the puerperal state. The empty uterus contracts into a firm, hard ball, felt just above the symphysis pubis. It continues for some little time to maintain more or less painful contractions known as "after-pains." These gradually cease. A discharge called the lochia is set up, which lasts for three or four weeks. It takes about six weeks for the organs to regain their normal size and condition. The process is known as involution. The puerperal state is one of peculiar liability to contagion. The interior of the uterus is after delivery in the condition of an open wound, eminently fit for the reception and development of septic germs. For this reason a nurse must never go to an obstetric case from one of contagious disease of any kind, or from a septic surgical case; and the same antiseptic precautions should be taken as in a surgical operation.

The average duration of a natural labor is sixteen hours, but in women who have previously borne children, and often even in primiparæ, it is frequently much less.

It is during the first stage of labor that the nurse is

likely to be summoned, and she should answer the call as promptly as possible, so as to have time to make all necessary preparations for the birth of the child without hurry.

Should you have opportunity for previous consultation with the expectant mother, you will frequently be asked to state just what provision it is desirable to make. The following list contains all the essentials, though it may be enlarged and elaborated to any extent to suit the individual taste: For the baby, there will be needed first a small old blanket, a pair of round-pointed scissors, not too sharp, to cut the umbilical cord, and tape or string with which to tie it. The best material is heavy Chinese silk, but narrow Dutch tape will answer. Next a bottle of olive oil, a piece of old white Castile soap, some clean soft bits of old linen, salicylated absorbent cotton, a small soft sponge, a box of talcum powder, not less than four dozen cotton diapers in three sizes, four strips of flannel for bands eighteen inches long by six inches wide, four long-sleeved flannel shirts, six flannel petticoats, eight plain slips, three or four soft woolly blankets (preferably knitted), and two dozen each of large and small nickel-plated safety-pins.

For the mother will be wanted six plain night-gowns, one or two flannel wrappers (light and loose), two flannel sacks, a pound of absorbent cotton and one of ordinary cotton batting, a rubber sheet, five yards of antiseptic gauze, and ten yards of stout unbleached muslin for bandages, etc.

In addition to the above-named articles for the mother and child, you should have at hand, when the critical time arrives, plenty of clean towels, a new nail-brush, soap, hot and cold water, ice, three basins, a bed-pan, a syringe, a clean glass catheter, vaseline (prefera-

bly carbolized), and brandy. Ergot and chloroform, carbolic acid, and bichloride solution are likely also to be needed. It may be well to ask the doctor whether he wishes you to provide these.

When it is determined that labor is actually in progress, the patient and the room should be got in readiness. Unless there is a previous history of precipitate delivery, the patient need not at once be put to bed; indeed, it is rather better that she should stand or walk about, resting occasionally on a chair, but maintaining an upright position, as this renders the axis of the uterus coincident with that of the pelvis, and so favors the descent of the head. The bed should be prepared for her, and well protected. The under sheet must be put on tightly, as it may not be changed again for some days, and covered by a rubber and draw sheet. Over these a second rubber and draw sheet should be placed, which, after the labor is over, can be removed, leaving the first clean and dry for the patient to lie on. Or, in place of this latter, an absorbent pad may be used, which is perhaps better, as it can afterward be burned. It should be about two feet square and two inches thick, and may be made of woodwool, jute, absorbent cotton, or—cheaper than either, and almost equally good—fresh pine sawdust loosely quilted into a well-washed muslin cover. Cheese cloth will not answer if sawdust is used, as it sifts through. If two or three pads are provided, they will be found very useful, and will save their cost in laundry work. Sometimes a cot is used during labor, and the patient is afterward transferred to the permanent bed.

The patient should have on a clean night-dress, and over it a warm wrapper, which can easily be slipped off when she is ready to go to bed. Brush the hair and braid it tightly. Give a thorough enema, and see that

the bladder is emptied. It may be necessary to use the catheter, owing to closure of the urethra by the pressure of the fœtal head, but usually there will be frequent and voluntary passage of urine. If the catheter is used, be sure that it is surgically clean. Wash the external parts before using it, and do not let it slip into the vagina. If this should happen, take it out, wash, and again disinfect it before introducing it into the urethra, as otherwise it may carry in enough vaginal mucus to set up cystitis, and so produce a painful complication. You will sometimes be directed to give at this time an antiseptic douche. You may at least wash the external parts, first with soap and water and then with a bichloride solution 1–4,000 or 5,000, using for this purpose absorbent cotton, which can be thrown away—not a sponge or a wash cloth.

The patient should be allowed plenty of digestible food, but no stimulants, as they increase the danger of post-partum hæmorrhage. Fluid diet is to be preferred, on account of the possibility that chloroform may be given later.

The first stage of labor occupies from three to six hours. An examination must be made early to discover the presentation of the child, but when this is once clearly made out, too frequent examinations are to be avoided, as during this stage they only irritate without being of much use. Before making any examination scrub the hands, especially about the finger-nails, most thoroughly with soap and water, rinse off the soap, and soak them in bichloride, 1–2,000. The hand taken directly from this solution will need no further lubrication for an ordinary examination. Introduce the finger into the vagina during an interval between pains until it reaches the open mouth of the uterus. The mem-

branes are then lax, and the presenting part of the fœtus can be most easily felt, but the degree of dilatation of the os can only be accurately ascertained during a pain, when the membranes are pressed against it. Be very careful not to rupture the membranes before the os is fully dilated. The examination should occupy the time taken up by a pain, and part of the interval preceding or following. In the first stage these intervals are long. Efforts at bearing down should not be encouraged, as their only effect is to exhaust the patient's strength. There is often nausea, and even vomiting. Cramps in the limbs are sometimes distressing, but can generally be relieved by straightening and rubbing them. Chills are not of rare occurrence. Neither of these is an alarming indication. The patient should be put to bed when the pains change from the back to the front, before the membranes are ruptured, if that event can be anticipated, as, if the body is upright when this occurs, there is danger that the umbilical cord will be washed down in the gush of waters. The clothing should be pinned up well out of the way, and an extra sheet spread over the lower part of the person, or an unstarched white muslin skirt may be worn. No one should now be allowed in the room but the necessary assistants.

The position taken may be on the back or the left side, as preferred, in either case near the edge of the bed. The latter is the English mode of delivery. In this country the dorsal decubitus is quite as usual, and generally seems easier for the patient. It is thought that in primiparæ the danger of tearing the perinæum may be less in the lateral position. In general it may be stated that the erect posture should be maintained during the first stage, the dorsal until the head is on the perinæum, the lateral during the birth of the child, and the dorsal

again during delivery of the placenta. Very little exposure is necessary; the clothing can be so arranged as to cover the patient and yet be protected from discharges.

If you have not been able to decide with certainty the presentation of the child before the membranes are ruptured, it is important that you do so immediately after, as there is a possibility of correcting a mal-presentation by external manipulation if it is discovered early—a possibility which is lost after the child once sinks into the basin of the pelvis.

In a natural labor the head presents. This is the largest part of the child's body, and where it passes the rest easily follows. The bones of the cranium are soft and yielding, and are united only by membranes, so that when pressed together they can overlap. There are two spaces between them, known as the anterior and posterior fontanelles. By these, and by the cranial sutures, the head is recognized, as well as by its being harder and firmer than any other part. After the rupture of the membranes, the scalp will afford a rough, hairy sensation, and the fontanelles can be distinguished from each other. The anterior is the larger, and has four corners; the posterior is triangular.

Pass a finger around the edge of the os to discover if any part besides the head has descended. If the cord has prolapsed, try if possible to replace it above the head, as it is likely to be crushed during the progress of labor, cutting off the child's circulation with fatal result. The operation of returning it will be facilitated by having the patient rest on her knees and elbows. Remember never to make any examination, or even to touch the patient in the region of the genitals, without first thoroughly washing and disinfecting the hands.

During the second stage, examinations must be more frequent, to test the degree of advancement of the head. The pains will now be more severe, the intervals between them shorter, and there will be an impulse to aid them by bearing down. This need not be suggested, as it will come of itself at the proper time. The patient not infrequently drops asleep for a few minutes between the pains. The only assistance that can now be rendered is to support the back, and to give the patient something to pull upon if she feels inclined. A sheet knotted to the foot of the bed may be useful for this purpose. As the head approaches the perinæum, this support should be taken away, and the bearing-down efforts discouraged, lest it be too suddenly stretched, and so torn. The progress of the head through the vulva must be rather restrained than hastened, as the more gradual it is the less is the danger of such a perinæal rupture. This is most likely to occur in a primipara, and is usually in consequence of the head being driven too far backward, and too forcibly against the perinæum. It may sometimes be averted by supporting the perinæum with the palm of the hand, and guiding the head forward. This support should not be continuous, but applied during the last two or three pains, when the anterior margin of the perinæum grows evidently thin. Careful watch should be kept, and, as the head emerges, it should be pressed forward and slightly upward, so as to relieve the strain upon the perinæum as much as possible. The hand should not follow the head, but be kept upon the perinæum as it retracts. If a tear seems imminent, do not allow the head to emerge during a pain, but work it out gradually in an interval between pains. This manœuvre is greatly aided by making traction with two fingers in the rectum. It is well to do the same while the shoul-

ders are passing, though the greatest danger is over when the head is safely born. Look to see if the cord is about the child's neck, and, if so, draw it gently down and slip it over the head. If it can not be loosened enough for this, or if it is wound two or three times around the neck, put a finger under one loop and cut it, tying both ends. There will usually be plenty of time for this, as there is apt to be an interval of several minutes before the shoulders follow the head. After that the perinæum need no longer be supported, and the hands may be free to receive the child.

As soon as it is born, lay it down at right angles to the mother, close enough to make no traction on the cord. The shock of exposure to the air will generally excite inspiration. If it does not, wipe out the mouth, to remove any mucus that may obstruct it, slap the child on the back, blow on it, or sprinkle with cold water. Do not cut the cord until the child has cried or until no pulsation can be felt in it; squeeze out the contents to reduce the bulk as much as possible, and tie it in two places, one about two and the other three or four inches from the child's abdomen, and cut between the two with blunt scissors, which will crush the vessels. The end of the cord should be examined after an hour or so, and, if there is any bleeding, another ligature should be applied. The ligature on the placental end is to keep the placenta from being drained of blood, in which case the shrinkage would make its expulsion less easy, and, in case of twins, might be fatal to the second child. The child, once separated from the mother and breathing properly, may be wrapped in a blanket and laid aside in a safe place while the mother receives attention. Immediately upon the birth of the child the assistant should have placed one hand over the abdomen, to se-

cure contraction of the uterus and to ascertain if there is a second child in it. It should be firmly held until after it is entirely empty.

The expulsion of the placenta may follow immediately upon that of the child, or after an interval of half an hour or more. If after its separation from the uterus it is detained in the vagina beyond a reasonable time, slight traction upon the cord will usually serve to remove it, but no such traction should be made while there is any attachment to the uterine surface. The uterus may be recognized as empty when it is felt as a firm, hard ball just above the symphysis pubis. If it fails to contract after the birth of the child, press it down into the pelvis, with the hand over the fundus, the thumb resting on its anterior surface, while the fingers are pressed down behind the organ. This will generally stir up a pain. If the placenta is not then expelled, repeat the movement with the next pain. As the placenta slips from the vulva, it should be caught and twisted round and round, so that none of the membranes will be left behind. A vessel should be at hand to receive it. Later it must be carefully examined to see if it is entire. If any portion is missing, it must be looked out for until it is passed, as it is a possible source of danger so long as it is retained. After examination, burn or bury it.

The vulva may now be bathed with warm disinfectant solution, the soiled articles removed, and a binder pinned firmly about the abdomen. A straight band eighteen inches wide is the best shape for this. It can be closely fitted with pins, and should come well below the hips, so as not to ride up. Sometimes a folded towel is put under it, just over the fundus uteri, to make additional pressure at this point. Over the vulva place

a pad of absorbent cotton or woodwool, folded in antiseptic gauze, or a moist bichloride dressing covered with oiled silk. Some such dressing as this, which can be burned as soon as soiled, has now almost entirely and very advantageously superseded the old-fashioned napkin. It should be renewed every three or four hours at first; every time it is changed, and when the patient urinates or defecates, the parts are to be carefully irrigated with the disinfectant solution, or with water which has been boiled. Before changing the dressing, the nurse should disinfect her hands as in dressing a wound, and take the same care to see that everything brought in contact with the patient is antiseptically clean.

After the first dressing the mother must be kept entirely quiet, and the nurse may give her attention to the child. No talking should now be allowed in the room, no visitors, no excitement of any kind. Before leaving the mother, note the condition of the pulse, which should be rather slower than usual, from sixty to seventy. If it is above one hundred, look out for some complication, especially hæmorrhage.

After the mother has rested a few hours, and the child has been washed and dressed, it is well to put it to the breast. The first milk, the colostrum, is of quite different quality from the later secretion, and has a purgative effect upon the child, clearing the intestines of the meconium, a dark viscid matter with which they are loaded at birth. The suckling of the child helps to secure contraction of the uterus, often occasioning quite severe after-pains; it excites more abundant secretion and draws out the nipple. Indeed, it is quite as much for the mother's sake as for the child's that it is put to the breast thus promptly. The baby will not suffer if it has no food at all for the first twenty-four hours. Do

not accept any suggestions with regard to the necessity of feeding it. The colostrum is scanty, but quite sufficient for the need. When the breasts are engorged, *very* gentle rubbing with warm oil, always in a direction from circumference to center, will accelerate the flow of milk. The milk does not appear in abundance until about the third day. Its secretion may be delayed till the fifth or sixth day. There is almost always some pain and constitutional disturbance accompanying it, and, if the breasts are not properly relieved, milk fever and mammary abscess may ensue. If the child can not empty the breast sufficiently, the milk should be drawn off by a breast-pump. A good substitute for a breast-pump is a champagne bottle with a smooth edge; fill it with hot water, let it stand a moment, then pour it out quickly, oil the edge, and apply the mouth of the bottle over the nipple. As the heated air condenses, the milk will be sucked out into the bottle. The condensation may be increased by wrapping around the bottle a towel wet in cold water. The same method is useful to draw out a retracted nipple, which the child has difficulty in grasping. Sunken or retracted nipples may be somewhat helped by gently drawing them out with the fingers several times daily. It is a good plan to manipulate them in this way during the last two or three months previous to confinement, and at the same time to rub them with vaseline or cacao butter, to render the skin soft and flexible. This treatment will go far to prevent them from becoming excoriated or fissured. Should this happen, it may be necessary to use nipple shields at the time of suckling. The nipples must be kept free from pressure, and the breasts protected by an extra covering, as they are very sensitive to cold. They need to be kept clean, but it is not well to bathe the nipples too much,

as it makes them tender. After each nursing, sprinkle them liberally with talcum powder without washing or otherwise drying them, and they will in the majority of cases need no other treatment. Of course this must be washed off before the child is again put to the breast, preferably with a weak solution of borax.

If the child, for any reason, is not to nurse, the secretion of milk must be checked. This is usually done by bandaging the breasts closely, supporting them by pads of cotton at each side, so that the pressure will be made evenly. The bowels must be kept open, and the amount of fluid taken into the system limited as far as possible. Belladonna is sometimes employed to help dry up the secretion, usually in the form of an unguent rubbed in gently. Rubbing of the breasts must always be toward the nipple.

The mother during the puerperal state requires the most careful nursing. She should be kept in bed for ten days or two weeks, not being allowed to sit up for any purpose, or in any way to exert herself. It is of the greatest importance that she and everything about her be kept clean. She should have a thorough sponge-bath all over every day, and the vulva should be washed two or three times daily. On the question of douches, doctors differ. If you have no especial directions, it is safe to give one of 1–5,000 bichloride or of boiled water immediately after labor and then no more unless the lochia become offensive, as may occur after five or six days. There should be no odor perceptible on entering the room. Have plenty of fresh air, but at the same time be careful to avoid chilling the patient, especially when she first gets up. The catheter must be used every six or eight hours if the bladder can not be otherwise emptied. There is often temporary paralysis of the vesi-

cal neck following labor. A laxative or an emollient enema should be given on the third day, and every second day thereafter until the bowels move naturally. The diet should be light and unstimulating for the first week; after that, if the patient is progressing favorably, she may return to her usual diet.

One of the greatest dangers attending childbirth is that of hæmorrhage. This may take place either before, during, or soon after labor.

Hæmorrhage immediately after delivery is known as post-partum hæmorrhage; occurring two or three days later, it is called secondary. It may follow even a perfectly natural labor so profusely as to endanger life. There is little fear of it while the uterus is firmly contracted. If it is felt to be enlarging and relaxing, it is a sign of danger, and every effort must be made to induce contractions, which prevent the escape of blood by lessening the caliber of the blood-vessels. This symptom, and other indications of hæmorrhage—as pallor, coldness of the extremities, feeble pulse and respiration —must be watched for, especially when the patient is asleep.

Watch particularly the lips, as the mucous membrane, being thinner, shows loss of blood more quickly than the skin. The blood may come in a sudden gush, or in a slow but steady flow, from the placental site, and is in consequence of failure of the uterine muscles to contract and close the blood-vessels left open by the separation of the placenta. The direct object of treatment is to induce contractions of the uterus. Open the windows to give abundant fresh air, elevate the foot of the bed, rub ice on the abdomen, and make vigorous pressure upon the uterus. You may give ergot if the uterus is empty, but never while the fœtus or placenta remain in

it. The important thing is to empty the uterus, and you should not hesitate to introduce the whole hand in order to clean it out. If the placenta has not been expelled, it must now be removed without delay, but never try to extract it by pulling upon the cord. The hand, first made aseptic and well oiled, should be inserted well above the placenta, so as to make sure of getting the whole of it. In the same way, you should sweep out any clots which may prevent the uterus from contracting, and knead the organ vigorously, with one hand inside and one on the abdominal surface. You may carry into the uterus with the hand a lump of ice, or a sponge soaking in vinegar, or inject hot water (116° F.), but with all this allow the patient herself to make absolutely no effort. The most efficient way of controlling the bleeding is to stuff the uterus full of iodoform gauze. This the nurse can do at once if she is alone and can not leave the patient to prepare a hot douche.

Internal hæmorrhage during labor is a formidable complication, since there may be no escape of blood externally. The patient suddenly collapses, and has a severe bursting pain in the abdomen. Labor pains cease and the uterus becomes greatly distended. Give stimulants hypodermically, and summon the nearest physician.

Another peculiar danger to which this state is liable is that of puerperal fever, a form of blood-poisoning most commonly established within three or four days after labor, resulting either from absorption of the decomposing matter produced by the woman herself, or from infection brought to her from some external source. After the raw surfaces are healed over and the os uteri closed, the danger is less, but antiseptic precautions ought still to be kept up. The disease is

commonly initiated by chills, followed by high fever, the temperature rising to 102°, 103°, or even, in severe cases, to 106°. The pulse is rapid; the countenance sunken and anxious; there is a sickly odor to the breath; usually diarrhœa and vomiting; the lochial discharge is suppressed, or becomes altered in character; the secretion of milk ceases. It is often complicated with peritonitis or metritis—inflammation of the uterus. The symptoms and severity are variable, but it is always dangerous and highly infectious. The treatment is practically the same as that of wound infection in general—the application of antiseptics to the affected surface and supporting the general strength. Fresh air, surgical cleanliness, and faithful antisepsis will prevent its development.

Another disease of the puerperal state, though not entirely confined to it, is phlegmasia dolens, commonly known as milk-leg, from a popular but entirely unfounded notion that the milk settles in the leg. It is caused by obstruction of the femoral vein by a blood-clot, and results most commonly from exposure or over-exertion; it is a local expression of septic infection. The leg swells and becomes intensely painful, the skin white and tense. There is often fever accompanying it, and sometimes chills. It is treated by absolute rest. Support the limb comfortably, keep it warm by enveloping it in cotton wool, and the condition may be expected to gradually disappear, though it does not always terminate so happily.

Puerperal convulsions sometimes occur, technically termed eclampsia. These are usually of a uræmic type, resulting from deficient action of the kidneys, and are very dangerous. On account of the premonitory symptoms, often overlooked, a pregnant woman should be

under the care of a physician for some time previous to labor, and during the later months the urine should be tested for albumin every ten days. Preventive treatment is most important.

Headache, with ringing in the ears and bright flashes before the eyes, dyspnœa, nausea, puffiness of the face, hands, and labia, and diminished excretion of urine, are among the alarming symptoms. Give large doses of cream-of-tartar water (ʒ ij–Oj), keep the bowels open with saline laxatives, and try in every way to induce free perspiration. Should the convulsions occur, they may be quieted by chloroform. If no chloroform is at hand, little can be done except to keep the patient from hurting herself. Eight or ten minims of Magendie may be injected, or chloral, gr. xx–xxx, may be given per rectum. Give plenty of fresh air, see that the clothing is entirely loose, and put something between the teeth to keep the tongue from being bitten. The patient will be entirely unconscious during the attack, and may rouse at first as if from sleep, but, unless speedy relief is obtained, soon sinks into fatal stupor. If œdema of the lungs suddenly develops, apply dry cups and mustard poultices.

A form of insanity may follow labor, known as puerperal mania. It usually takes the form of melancholia, often with a disposition to injure the child. It is acute while it lasts, but rarely permanent. It is a possibility against which the nurse should always be on her guard, as it may come on very abruptly, sometimes even before the labor is ended. Look out for a patient who has been low-spirited during pregnancy.

CHAPTER XXII.

The care of infants—Treatment of suspended animation—Washing and dressing the baby—The baby's food—Sick children—Early symptoms of disorder—Thrush—Ophthalmia—Digestive disturbances—Cholera infantum—Convulsions—Croup—Whooping-cough—Mumps—Chicken-pox—Measles — Meningitis—Hydrocephalus—Rachitis.

THE care of an infant begins with its separation from the mother and the tying of the umbilical cord. Independent circulation and respiration should now be established, and its existence as a separate entity commences. The first thing is to see if the heart is beating and the child is breathing properly. The shock of contact with the air will generally excite respiration, but if it fails to do so it must be artificially stimulated. To do this, first wipe out the mouth and throat with the finger to remove any accumulation of mucus which might obstruct the air passages, then fan or blow upon the child sharply, sprinkle cold water in its face, slap its back, or, if these measures produce no effect, dip it alternately into cold and hot water. The cold water is merely to produce shock, and the child should remain in it but an instant, and then be immersed for a minute or two in hot water—not over 110° Fahr. Then dry and rub with flannel. If natural respirations are still not established, they should be artificially produced—after Sylvester's

method—and kept up as long as the heart beats ever so faintly. If the child seems strong and the heart-beats are vigorous, Schultze's method of establishing respiration may be adopted. His procedure is as follows: Stand and grasp the child so that your thumbs rest on its chest, the index-fingers are in the axillæ, and the other fingers cross the back diagonally. Suspend the child, held in this manner, between the knees, its face to the front; swing the child upward until your arms are horizontal, then stop suddenly. As the child's head falls backward, support it with the fingers which rest on its back. The legs will curl forward, as if the child were going to turn a somersault backward, and the weight of the body will be thrown upon your thumbs, compressing the thorax and abdomen, and causing a forced expiration. Swing the child back to its former pendent position, and a deep inspiration will be produced. Repeat eight or ten times at intervals of ten or fifteen seconds, then drop the child into a warm bath. If it does not yet breathe, repeat the swinging process as before. This mode of treatment, though in some cases excellent, should not be tried on a feeble infant with weak action of the heart. Do not swing the child too often, and stop if it begins to breathe. Through all these processes, be careful not to let the child become chilled. After every shock of cold water or cold air, a plunge into warm water should be given to restore the vital heat. In delicate and especially in premature infants, although breathing, there may be very low vitality, and warmth may be more essential to their preservation than anything else. It is often a matter of difficulty to keep them warm enough. A *couveuse* or incubating apparatus, in which a perfectly even temperature can be maintained, is sometimes used, and the child is kept

in it until it has acquired sufficient vigor to endure the variations of an ordinary atmosphere.

All babies need at first a great deal of warmth. Through fear of chilling them, some physicians prefer not to have a child washed for several hours, or even days, after birth. To remove the *vernix caseosa*, or cheesy varnish with which it will be more or less covered, it may be rubbed with sweet oil, and then wiped off with a soft cloth. For a feeble child, this is all the cleansing of the body necessary at first, except that in all cases the eyes must be thoroughly washed. For this purpose use a warm saturated solution of boric acid.

Ordinarily, however, the baby may be washed at the nurse's convenience, while the mother is resting. The bath should be given in a warm place, and its temperature be not much above that of the air. An old-fashioned way of testing the heat of the water is by the elbow, to which it should feel neither cold nor warm.

Take the feet of the child in the right hand, the shoulders in the left, letting the head rest upon the arm, and lower it very gradually into the water. Still supporting the head with the left hand, wash it all over with a clean soft sponge, then lift it out into the folds of a warm towel. Dry thoroughly, especially about the joints, but without much rubbing. Dust with talcum powder under the arms and between the legs, and look to see if the anus and urethra are open and the child in a normal condition all over. Wrap the cord in dry salicylated cotton and lay it on the left side of the body. Keep it in place by a flannel band about the abdomen, tight enough not to slip, but not so tight as to impede the child's respiration. All the garments should be warm and not too tight. Put one inside another, and the

whole on over the feet rather than the head, turning the child no more than is necessary.

From this time on the baby should have a bath all over daily. The best time for it is in the morning, and half-way between two meals. The temperature of the room in which it is given should be not less than 75°, and the temperature of the water 100°. The child should not remain in the tub more than five minutes. Little soap is needed and little rubbing, for the skin is very tender. Use talcum powder where there is any suggestion of chafing. Fresh, dry cotton should be put on the cord each day until it falls off, which it will do in about a week; boric acid is a good dressing. It is well then to keep a compress over the umbilicus until it is depressed and of the same color as the surrounding skin. The shirt should be long enough to meet the diapers, to which it may be pinned. It also should be of flannel, with long sleeves, and open all the way down the front. Over this a flannel petticoat or sleeveless slip should come down well over the feet. Socks are unimportant while long dresses are worn, but the feet must be kept thoroughly warm. The outer garments vary to suit the taste, but everything should be soft, warm, and loose. Cotton diapers are better than linen. These should be changed as soon as wet, and never used again without having been washed. The bowels may be expected to move two or three times daily. The meconium ought to be cleared out and water passed during the first twenty-four hours. If the latter fails to occur, apply a hot stupe over the kidneys. The child's breasts will sometimes be swollen and full of milk for a few days after birth. Do not rub or let the clothing make any pressure upon them, and the condition usually will gradually disappear without treatment.

As a rule, the most suitable food for a baby is its mother's milk, or, that failing, the nearest approach to it that can be made, though there are exceptional cases in which the mother's milk fails to agree with the child. The child should be fed during the first three months at intervals of two or three hours regularly. The intervals may be longer at night. In putting the child to the breast, see that the nostrils are not obstructed; otherwise it can neither breathe nor suck. It should not be allowed to go on sucking indefinitely after it has had food enough, or to suck an empty feeding-bottle, its own fingers, or anything else. This may keep it quiet for a time, but ultimately makes matters worse by getting its stomach overloaded or full of wind. A baby need not be assumed to be hungry because it cries, but something is the matter with it, and it is the business of the nurse to find out what. It does not cry unless it is in some way uncomfortable. A child a month old should sleep twenty hours out of the twenty-four without being rocked or carried about. Habits will be easily acquired at this age. The child should sleep in a crib, and be taught to go to sleep by itself. Let it lie on either side, not directly on the back, as there is danger in this position that the milk may regurgitate and get into the trachea. Do not have a strong light in the room, as the eyes of both mother and child are weak. If the child is not to nurse its mother, it may be given half a teaspoonful of the sirup of rhubarb soon after birth to remove the meconium, as it will miss the purgative action of the colostrum.

In the absence of the mother's milk, that of a suitable wet-nurse is considered the best food for the child, but desirable ones are very difficult to find. She must be a perfectly healthy and not nervous woman, whose

own child is nearly the age of the one she is to nurse. If cow's milk is used, it must be at first diluted with twice as much water, and slightly sweetened. The proportion of water may be gradually lessened, until after six months the milk may be given pure. Milk from a single cow is no longer recommended, as the average from a well-cared-for herd is more uniform in quality. Condensed miik is, perhaps, of more even quality than the ordinary dairy product, but it is apt to be constipating. Unless the milk is exceptionally pure and didirectly obtained, it should be sterilized before use. Unless it comes from thorough-bred Jerseys, cream should be added to it and a little salt. Sugar of milk is the best for sweetening, and boiled water should always be used for diluting the milk. An excellent formula is that known as Meigs's mixture, consisting of

1 part milk,
2 parts cream,
2 " lime water,
3 " sugar water.

The sugar water is made by adding two heaping tablespoonfuls of pure sugar of milk to a pint of water. Sterilize the entire mixture. Warm any bottled food to a temperature of about 98°, and take the greatest pains to have bottles, stoppers, and nipples absolutely clean. The "Mizpah" is much the best nipple to use. This has a little tube for admitting air to the bottle as fast as the milk goes out. Boil it for half an hour every day.

If the food is rejected, either the child is overfed—a common source of trouble—or the food is in some way unsuitable. Vomiting by an infant is rarely attended with much constitutional disturbance. A child is often rendered restless by thirst, and will be quieted and relieved by a little clear cold water. After eight or ten

months the daily meals should not exceed six in number. An allowance of bread and milk, or beef-tea, may be given, but it should not come to depend upon solid food until all the teeth are cut. Contrary to the common impression, thick food is less nutritious than thin. The first teeth may be looked for at about the sixth or eighth month, and the others at intervals, until the first set of twenty is complete, at about the age of two years. The process of dentition may be accompanied by various functional disorders. It unsettles the healthy balance of the system, and predisposes to, if it does not exactly cause, disease. The child may be restless and feverish; diarrhœa is common; sometimes even croup and convulsions occur. These need medical advice, as at other times, and great attention must be paid to general nursing and dieting. Keep the little one in the open air as much as possible, suitably clothed. If the gums are very painful and swollen, it may be necessary to have them lanced.

A high degree of development of those qualities desirable in any nurse is requisite in the care of sick children. This calls for infinite tact, patience, and judgment, and especially is the habit of critical observation essential, for, with children too young to speak the involuntary revelations of signs and gestures give often the only clew to the seat and kind of distress. The objective symptoms are, fortunately, very marked in children, and they respond to treatment with a readiness which makes them very interesting subjects. A good deal may be learned from the character of a baby's cry. With abdominal pain the cry will be long, loud, and tearful, subsiding, as the pain is relieved, into long-drawn sobs. The legs will be drawn up to relax the strain on the abdominal muscles. If there is inflamma-

tion of the chest, there will be less tears and less noise, the cry begun after each deeper breath or cough will be sharp and suppressed, evidently augmenting the pain. Sharp screams, alternating with low moans or stupor, suggest some affection of the brain. Waking suddenly with a cry, grinding the teeth, or starting nervously in the sleep and boring the head into the pillow are all noteworthy symptoms in children. No departure from the usual habits of the child is unimportant. Note whether it is unusually stupid, restless, or irritable, in what position it seems most easy, whether the light occasions distress, and whether the general symptoms of disorder increase in severity toward night. The temperature should be taken in the rectum. If a child complains of pain anywhere, and has a rise of temperature, it is safe to examine the throat. The pulse of an infant can only be taken with any approach to accuracy during sleep. A very slow pulse is more ominous in a child than a rapid one. Children gain and lose flesh with great rapidity, showing it first on the inner side of the thighs, where two or three days' illness will have a marked effect.

In dealing with sick children the utmost gentleness is necessary. They ought never to be frightened or startled. It is a bad time to introduce a stranger to a shy baby when it is sick, and the first thing to be done —often a very difficult thing to do—is to acquire the child's confidence. Until it has become accustomed to your presence, it may be best to allow everything to be done for it by the mother or usual attendant, while you merely give directions. A child accustomed to unlimited indulgence, afraid of strangers, and fretful from pain is not an easy patient to manage; it will require winning tact and a genuine sympathy for the little one

to get even the possibility of caring for it helpfully. Whatever excites or alarms does the child harm, making it nervous and feverish. Do not give too many toys in the effort to divert, one at a time is better than a dozen; and, above all, do not let the child see any that it can not have. Children may be attacked by many of the same diseases as older people; there are also some which are peculiar to them, and others which appear most frequently in early life. When a child first exhibits indisposition, it is always safe, and often soothing, to put it in a warm bath. This will tend to bring out any latent rash, for which the whole body should be carefully examined. The room should be warm and free from draughts, the temperature of the bath 100° Fahr., and the child allowed to remain in it about five minutes. If the baby is afraid of the water, prepare the bath out of sight, and cover it with a blanket. The child can then be gradually let down into the water, blanket and all, without any shock. When taken out, it should be wrapped in a soft dry blanket for a few moments, and then dried with soft towels. Guard against exposure, keep as quiet as possible, on the simplest diet, and watch carefully for further signs of disorder.

Thrush is a sort of fungoid growth appearing in the form of white spots on the tongue and inside of the mouth. It may result from improper food, or from neglect to wash out the child's mouth after eating. Particles of milk remaining in the mouth decompose, and set up fermentation. The remedy most frequently prescribed is a wash of borax water, gr. xx–℥ j. Errors of diet should be corrected, and great attention paid to the cleanliness of feeding-bottles, etc. If it is allowed to spread, it may extend into the throat and cause difficulty in swallowing, or even attack the stomach, when

it may prove fatal. It is a serious indication if an eruption appears about the anus simultaneously with thrush in the mouth.

Ophthalmia neonatorum.—Soreness of the eyes in a young child is a serious matter, requiring prompt attention. A purulent exudation may occur, inflaming the lids and gumming them together. This is usually in consequence of some infection received at the time of birth from the maternal discharges, and first manifests itself about the third day. It is in order to guard against this that so much care is taken to cleanse the eyes thoroughly immediately after delivery. Should the least sign of such inflammation be observed, the eyes must be frequently bathed with warm water or a solution of boric acid, and the greatest care be taken to prevent the spread of the disease, for the discharges are highly infectious, and the danger of contagion is not confined to children. In bathing the eyes, separate the lids without making any pressure on the eyeball, and let a stream of clean warm water trickle over the surface, always in the direction from the nose to the outer angle. Do not rub them in the least, but repeat the syringing until they are entirely free from matter. It may be necessary to do this every hour. A little absorbent cotton will serve to hold the water, or a perfectly clean medicine dropper may be used. If they do not show improvement promptly, the granulations should be touched with a solution of nitrate of silver, gr. xl–℥ j. Burn at once the cotton and any cloths used about the eyes, and disinfect your own hands most carefully, scouring the nails with a brush. Do not touch your own eyes with your fingers before they are cleaned, and if one eye only of the child is affected, lay it down always on that side, that the other may not be contaminated.

Neglect of this trouble for a few days may result in total loss of sight.

The most common troubles of children are disorders, more or less severe, of the digestive tract. In the case of a feeble child unable to take or retain food, "gavage" or forced feeding may have to be resorted to. For this purpose a rubber catheter is used, connected at the open end with a small glass funnel. The point of the catheter introduced at the back of the tongue or through the nose will be instinctively swallowed, after which the food is poured into the funnel, and after a few seconds quickly removed. If skillfully done, the food will be retained. Washing out the stomach by the aid of a similar apparatus has in some cases been found beneficial.

Colic.—The wind colic of infants, though distressing, seldom requires medical treatment. If persistent, it is probably due to unsuitable food; or, in the case of a nursing baby, to the condition of the mother. Do not give soothing-sirups. Rubbing and the application of hot flannels to the abdomen will usually relieve it. A little hot water flavored with peppermint or anise may be given, or, if this fail, try two or three drops of gin in hot water.

Diarrhœa.—When diarrhœa is present, a little calcined magnesia or castor oil may be given. Put a flannel band about the bowels, and be sure to keep the child warm. The skin is apt to become chafed and sore; scrupulous attention must be given to cleanliness. In place of soap and water, very thin starch may be used and will be found soothing. Dry carefully, and dust with talcum powder, or dry starch. If the diarrhœa is long continued, it will be exhausting. Have medical advice, and do not give paregoric without it.

Constipation.—When there is a tendency to constipation, rub the bowels night and morning with warm olive oil. Oatmeal gruel will be a helpful diet. A small suppository of Castile soap will usually induce a movement. Gluten or glycerin suppositories are also good. It is well to establish regular habits in children, and with a little pains it can be done early; but it is most injudicious to urge them to strain until something has been accomplished.

Protrusion of the bowel may be caused by straining. If it has occurred, lay the child on its back, with the hips elevated, wash the parts carefully in tepid water, and replace the bowel very gently. If it can not be done readily, the child must be kept quiet, and the doctor sent for.

Worms.—Delicate children are sometimes troubled by worms in the intestine. Round and pin worms are the most common. The tape-worm is more often found in adults. It is desirable for the nurse to become acquainted with these parasites, in order that she may recognize them. The only reliable symptom is their presence in the stools. A dose of castor oil may be given, and, after it has operated, injections of warm water and salt daily until the trouble is at an end.

Incontinence of Urine.—Nocturnal incontinence is a common trouble among children, and one for which medical advice is necessary. It should be cured before it becomes a confirmed habit, but scolding or punishing the child will not do it. The simplest plan is to make the child rise during the night to pass its water.

Cholera Infantum is one of the most fatal diseases among young children. It usually begins with diarrhœa or indigestion. It comes from overfeeding, heat, and impure air, and is aggravated by teething, though

never caused by it. The child loses flesh rapidly, becomes restless and feverish, has intestinal pain and excessive thirst, but no appetite, and the food is not assimilated. Medical advice should be summoned early. The child should be kept cool and much in the open air. Entire change of air is advisable.

Convulsions in children may result from indigestion, worms, difficult dentition, fright, or any extreme nervous excitement. Muscular twitchings come on suddenly, sleeping or waking. The fits usually last only a few moments; a succession of them is alarming. The doctor should be at once sent for, but treatment should not await his arrival. Remove the clothing with as little disturbance as may be, and put the child in a warm bath. Keep the head cool. An enema of soapsuds may be given, or a dose of castor oil. If the temperature rises to 103°, put in a cold pack.

Croup is an inflammation of the larynx and trachea. It may come on gradually, with a cold in the head, wheezing, hoarseness, and short, dry cough, or the child may be wakened in the night by sudden dyspnœa and violent choking. There will be a long-drawn inspiration, accompanied by a characteristic sound, a ringing cough, the voice will be husky, the skin hot and dry. There are two varieties—membranous croup, usually fatal, and spasmodic croup, rarely so. The former is of rare occurrence as compared with the latter. The treatment until the doctor arrives is in either case the same. Keep the temperature of the room not lower than 65°, and a tea-kettle boiling to moisten the air. If the breathing is labored, give an emetic—the sirup of ipecac in drachm doses is in common use—and repeat at intervals of half an hour until there is free vomiting. Give a hot bath. Hot stupes around the throat will sometimes afford re-

lief. Prop the child up with pillows, and keep it quiet, avoiding everything that will excite crying or coughing. Simple spasmodic croup usually yields readily to treatment, though the attacks are likely to recur, and the child must be protected with extra care for some days. Membranous croup is characterized by an exudation of false membrane in the throat, and is by many authorities considered identical with diphtheria. The early symptoms are much the same as those above described; as the disease progresses, the child becomes dull, irritable, and disinclined to speak. The head is thrown back, the face distressed and bathed in cold perspiration. In the last stages stupor comes on, from which the child must be roused for nourishment. This can only be given in small quantities. When the air passages become obstructed, tracheotomy is sometimes resorted to, or more commonly now intubation of the larynx.

Whooping-cough begins like an ordinary cold, the peculiar whoop not being heard until after the first ten days. It lasts from one to three months. The child should be kept out of doors if the weather is fit, and should have a light, unstimulating diet, special care being taken to avoid constipation. The chief danger is of bronchitis or inflammation of the lungs supervening.

In all diseases of the lungs or air passages the child should be kept quiet, in an even temperature, with pure air. The head should be well elevated, as the breathing will be less labored in a nearly upright position. The sputa will generally be swallowed by young children, and will sometimes be vomited up in quantity.

Mumps is another common juvenile disease, not very dangerous. It is an inflammation of the salivary glands, chiefly the parotid, and may affect one or both sides, together or successively. There will be pain and swell-

ing under the ear, with difficulty in swallowing, or even in speaking. Hot applications afford the most relief. If there is suppuration, which is rare, poultice. There will be more or less fever, and some slight laxative may be required. The disease reaches its height in three or four days, then declines rapidly.

Chicken-pox, or *varicella*, commences with slight fever. After twenty-four hours an eruption of reddish pimples appears, generally thickest on the back. In a day or two these become blisters, and within a week disappear. Little medication is called for. A warm bath may be of service. Isolate the patient if there are other children.

Measles (*rubeola*) is a disease not confined to children, but is most common among them. It begins like an attack of acute catarrh, with sneezing, coryza, hoarseness, sore throat, cough, dyspnœa, and some fever. The average period of incubation is eight days. The eruption of pimples comes out not later than the fourth day from the appearance of the first symptoms, in dark, somewhat crescent-shaped patches, first on the face, neck, and arms, later on the trunk and legs. This lasts from two to five days, then fades in the order of appearance, leaving a brownish stain and mealy desquamation for a week. At this time diarrhœa is apt to set in. The disease itself is not likely to be severe in a child, but is often complicated or followed by bronchitis, pneumonia, gastric troubles, ophthalmia, or otorrhœa—inflammation of the ear. To avoid such sequelæ, great care is required, even after convalescence is established. The child should be kept in bed, and on light diet, until all feverishness has left it. Great warmth is not required, but protection from draughts is important. The eyes should be shielded from strong light, and care be taken

not in any way to strain them. A generally lowered tone of the system may persist for some time.

Roseola, or *German measles*, is a fugitive eruption, lasting a few hours or days, very mild, but is supposed to be contagious. A second attack of either this or true measles is rare.

Acute meningitis is a disease also most common in children under five years of age. The symptoms vary very much. It most often comes on gradually, with wasting of the body, disordered bowels, capricious appetite, nausea, headache, fever, irritability, intolerance of light and noise. The child may seem constantly drowsy, but the sleep is restless and disturbed. Squinting and enlarged glassy pupils are common symptoms. As the disease progresses, convulsions or paralysis may occur, or the patient sink into a comatose condition. Perfect quiet is an essential part of the treatment. Keep the child in a dark room, in bed, with the head elevated. Do not rock or walk about with him, or in any way move him unnecessarily. Do not startle or excite him. Cold applications to the head will probably be ordered, and purgatives. Only the lightest food should be given.

Hydrocephalus.—Water on the brain is an affection of early childhood due to an abnormal accumulation of fluid in the brain. The head in these cases will be very large, and the fontanelles fail to close. Intelligence does not develop, and death usually takes place soon.

Rachitis.—The disease commonly known as rickets is most commonly met with among the poorer classes, and is due chiefly to bad feeding and bad air. There are the general symptoms of malnutrition and digestive derangements with marked tendency to pulmonary complications. The child is feeble and irritable, with en-

larged head and distended abdomen, sallow and emaciated, and perspires profusely. The bones lack firmness, in consequence of a deficiency of lime-salts, and are often misshapen and deformed. The treatment consists in improving the general hygienic condition, correcting the diet, and insisting upon cleanliness and fresh air. The disease itself is not directly dangerous to life, but it lowers the resistive powers to such an extent that its complications are often fatal.

CHAPTER XXIII.

Special Medical Cases—Diseases of the Respiratory System—Of the Circulatory System—Of the Digestive Tract—Of the Kidneys and Skin—Affections of the Brain and Nervous System—Fevers.

THERE are a few special diseases for the care of which some special directions may be needed, supplementary to the general directions for nursing in all cases. Although a slight attempt is made at describing them, it is not to be expected that any given case will correspond exactly with the type except in general features. Variations and complications are endless, and clinical diagnosis is not expected of you; but you will find it an advantage to know what course a disease naturally takes, and what dangers are especially to be guarded against.

Let us first consider the diseases of the respiratory organs.

Catarrh of the nasal mucous membrane—cold in the head—is so common as to need little description, and is one of the cases in which an ounce of prevention is worth many a pound of cure. Ill-ventilated and overheated houses are responsible for much of the susceptibility to colds. Pure air, warm clothing and dry feet are the best preventives. If taken in the earliest stage, a full dose of quinine will sometimes abort a cold. Ten

grains of Dover's powder taken at bed-time will often cut it short. Once established, little can be done except to avoid adding to it. It will usually pass off after a few days without any special treatment. The discharge from the nose, technically known as coryza, may be relieved by the inhalation, through a paper cone, of the vapors arising from a solution of pulverized camphor or compound tincture of benzoin, about a teaspoonful in a pint of boiling water. Neglected colds may result in a condition of chronic catarrh, very difficult to overcome, or may even lead to dangerous pulmonary disease. Ozæna is a chronic form, marked by a peculiarly strong and offensive odor.

Bronchitis is an inflammation of the bronchial tubes, acute or chronic. Capillary bronchitis is the most dangerous form. The acute disease begins with a heavy cold, sometimes ushered in by slight chills. There is fullness in the head, sore throat, general malaise, with pain in the chest and cough, at first dry and then accompanied by watery sputa, which later become viscid and purulent. As the dyspnœa increases, there may be high fever, rapid pulse and profuse perspiration. The patient must be kept in one room, well aired, at an even temperature not higher than 68° Fahr. Free action of the skin is to be secured, and the bowels opened. A mustard plaster on the chest may relieve the pain, and inhalations of steam allay the cough. Plenty of nourishishing food should be given. During convalescence special care should be taken to avoid sudden changes of temperature, as the patient will be very susceptible to chills. In the majority of cases, recovery may be looked for, but it is sometimes fatal, or may assume a chronic form.

Asthma is a form of dyspnœa, caused by spasmodic

contraction of the bronchial tubes, for which you should know the popular remedies in case of emergency. It is often associated with chronic bronchitis. It is rarely dangerous, but always distressing. The patient gasps violently for air, his expression is anxious, pulse feeble, the skin cold and pale or cyanosed. Elevate the arms, and give all the air possible. A drachm of Hoffmann's anodyne may be administered, and repeated after half an hour if the condition is not relieved. It may last for several hours, and is usually concluded by a paroxysm of coughing and a free expectoration of mucus. Blotting-paper which has been saturated with a strong solution of saltpetre and dried, affords when burned, fumes that may give relief; stramonium leaves rolled into cigarettes, or smoked in a pipe like tobacco, are sometimes ordered.

Laryngitis is an inflammation of the lining membrane of the throat extending into the larynx. It may result from cold or local irritation, or may be associated with tuberculous disease. There is hoarseness of the voice, sore throat, usually some fever, and in the more severe cases, difficulty of breathing in consequence of the swelling. Treat with steam inhalations.

Pleurisy is an inflammation of the serous membrane covering the lungs, and often occurs as a complication of pulmonary disease. The surfaces of the membrane become dry and no longer slide easily over each other. There is acute pain on inspiration, short, repressed cough, inability to draw a long breath, some elevation of temperature, often preceded by a sense of chilliness. The pain may be relieved by the external application of counter-irritants, and the disease may subside at this stage, or the inflammation may continue, and an effusion of fluid into the pleural cavity may take place. This may be so abun-

dant as to embarrass the action of the lungs and heart. The acute pain of the first stage will be diminished, but there will be increased fever and dyspnœa. In order to relieve this condition, aspiration may be necessary, an operation which consists in drawing off the fluid through a hollow needle. This should always be saved for examination. It is usually simply a serous fluid of amber hue, but in some cases there will be an accumulation of pus. This form of pleurisy is termed empyema, and necessitates a free opening and thorough drainage of the pleural cavity. It may also have to be washed out with some antiseptic fluid. As soon as the cavity is emptied, the temperature will begin to fall.

Pneumonia, inflammation of the lung substance, is one of the most serious of the pulmonary affections. It may occur independently or as a complication in the course of some other disease. One or both sides may be affected, more often the right lung alone. It is usually initiated by a chill, or sense of chilliness with deep-seated pain, and shortness of breath. High fever follows, with flushed face, often on one side only, headache, and restlessness. The respirations are shallow and rapid. The urine is scanty and high-colored. The cough is short and hacking, the expectoration at first scanty. After twelve or eighteen hours, it may be expected to increase in quantity, and to assume a tough, tenacious quality, highly characteristic. It may be rust-colored or streaked with blood. The sputa should be carefully preserved for the doctor's inspection. The disease reaches its height by the end of the first week; in those cases which terminate by resolution—gradual restoration of the inflamed part to a normal condition—the febrile symptoms rapidly decline. When suppuration takes place the fever is likely to continue a week

or two longer. There is a tendency to delirium, especially at night. The great danger is failure of the heart. The patient must be kept in bed, absolutely quiet, and on fluid diet. Save his strength in every possible way; do not allow unnecessary talking, or any exertion. Be careful not to overload the stomach, though nourishment is of the first importance and stimulants may be necessary. Convalescence, once established, will be rapid. With pneumonia in alcoholic subjects, nervous symptoms are prominent, and the characteristic sputa may be absent.

Phthisis, or pulmonary consumption, is a disease almost always fatal sooner or later, characterized by a morbid deposit of tubercles in the lungs. These tuberculous nodules may attack other parts of the body also, and have a great tendency to spread. The disease is now regarded as infectious, and a hereditary susceptibility to it has been observed. Exposure, overwork, and intemperance favor its development. The course of the disease may be acute, terminating in a few weeks, or chronic, lasting for several years. It most commonly attacks persons under thirty years of age. The symptoms vary. The most characteristic are the cough, fever, night sweats, spitting of blood, gastric derangement, with loss of appetite, gradual emaciation, and increasing weakness. The onset is usually gradual, and periods of apparent improvement may occur, but it is rarely permanent, and the patient finally dies either from hæmorrhage or exhaustion. The distressing symptoms may be alleviated, but treatment which will positively arrest the progress of the disease is yet to be discovered. Change of climate may exert a beneficial influence. If that is impracticable, some out-of-door occupation should be adopted, for life in the open air offers almost the only

chance for recovery. A dry atmosphere with plenty of sun and free from wind is the most desirable. Defective ventilation and overcrowding are, of all things, to be avoided. Liberal diet is important, though there is often defective assimilation as well as lack of appetite.

The most common forms of *cardiac disorder* are pericarditis, endocarditis, valvular diseases of the heart, dilatation, and fatty degeneration. They occur in the majority of cases as sequelæ or complications of other diseases, notably of rheumatism. All that a nurse needs to know about these is the special care required by patients subject to them, and how to treat the alarming symptoms which sometimes occur. With all cardiac cases, overexertion and occasions of excitement are to be guarded against, and in the matter of diet the doctor's directions should be most carefully followed. Anything which accelerates the circulation is likely to bring on palpitation and dyspnœa. In severe cases, the difficulty in breathing may occasion great distress even when the patient is in bed and entirely quiet. The recumbent position may be rendered impossible from this cause. Difficulty in the return of blood to the heart may result in dropsy, and exudation of serum from the veins into the connective tissue and the cavities of the body. General dropsy is termed anasarca. An accumulation of such fluid in the peritoneal cavity is known as ascites; this may occasion so great distention as to interfere with the movements of the diaphragm, and must then be removed by tapping. Fluid in the connective tissues produces a swelling called œdema. This will be most marked where the skin is loose. Pressure with the finger upon an œdematous swelling will make a distinct indentation, which does not immediately disappear when the pressure is removed. Dyspnœa and dropsy are two

symptoms which occur either together or separately in nearly all serious affections of the heart.

Angina pectoris is the name given to certain attacks of intense and characteristic pain sometimes occurring in connection with heart-disease. The spasms are sudden and agonizing, accompanied by extreme dyspnœa, and in some instances are fatal. Relief may be obtained by inhalation of chloroform or nitrite of amyl, or by an injection of morphine.

Aneurism is disease of the arterial wall, producing dilatation, thus forming a tumor which may give rise to various distressing symptoms, and possibly occasion sudden death by its rupture. It is treated by rest and restricted diet, and, if accessible, by surgical operation.

Indigestion, or *dyspepsia*, may be merely a slight functional disorder, or a symptom of serious disease. It is variously manifested. There may be pain, nausea, regurgitation, flatulence, palpitation, headache, with constipation or diarrhœa, and numerous other minor symptoms, all more or less associated with the inception of food. Dyspeptics are notorious for constantly studying their symptoms. Food unsuitable in quality or quantity or insufficiently masticated is a common cause of indigestion. Overfatigue often produces it, and alcoholism always. No general rules can be laid down for treatment, as what suits one case will not another. It is necessary first to discover the cause of the trouble. Good sanitary conditions, regular habits, exercise, and simple food are always important.

Gastritis, inflammation of the lining membrane of the stomach, is one of the more serious troubles marked by chronic dyspepsia. The symptoms are mainly those of indigestion, with acute pain and tenderness of the stomach. Food, especially solid food, aggravates the

pain, and in severe cases can be retained only in the smallest quantities. Ulcers of the stomach may develop, and sometimes perforation takes place, producing fatal termination. Only the lightest and most digestible foods should be allowed—in severe cases fluids only; or nourishment by the stomach may be entirely suspended and nutrient enemata be substituted. Rest is important. Counter-irritation over the stomach may relieve the pain and nausea.

Peritonitis follows perforation of the stomach or bowels, or any other injury of the membrane covering the intestines. It is usually, if not always, of septic origin, and is a very dangerous form of inflammation. There is acute pain, with tenderness over the abdomen, fever, rapid, wiry pulse, great depression, vomiting, and constipation with tympanites. There may be retention or suppression of urine. Delirium is not uncommon. The patient should be moved as little as possible, and not allowed to sit up for any purpose. The bedclothes may be lifted from the abdomen by a cradle, and any applications ordered must be made as light as possible. Hot fomentations may be helpful. Nourishment should be given in strict accordance with orders, and stimulants may be required. It is now customary to keep the bowels open with saline cathartics, and to withhold opium as much as possible.

Appendicitis is an inflammation of the vermiform appendix, usually accompanied by more or less peritonitis. The symptoms and treatment are much the same. The great danger to be feared is perforation.

Typhlitis is an inflammation of the cæcum, occasionally leading to perforative ulceration.

Intestinal obstruction may result from strangulated hernia or other causes, and unless relieved is soon fatal.

Obstinate constipation is present, followed by stercoraceous vomiting, abdominal distention, and pain, but usually not much fever. Make hot applications externally, and give sips of hot water to relieve the thirst and vomiting, but little if any food, and no purgatives. Get advice promptly, as early abdominal section may be the only hope.

Dysentery is an inflammation of the mucous membrane of the large intestine. It may be preceded by various digestive disorders, abdominal tenderness, a sense of chilliness, and a rise of temperature at evening. It usually begins with diarrhœa, followed by tenesmus (which is the characteristic symptom), griping pain, and discharge of mucus from the bowel, streaked with blood, and lacking the healthy fæcal odor. Ventilate freely, and disinfect the stools. Keep the patient flat on his back, warm, and quiet. Put a broad flannel bandage around the abdomen. Give but little water. Feed on boiled milk, corn-starch, rice-flour, arrow-root, etc., not very hot. The inflammation may lead to ulceration or sloughing of the intestine, and death from collapse.

Cholera morbus, or sporadic cholera, is usually caused by indigestible food or impure water. It exhibits many of the appearances of the epidemic disease, but is comparatively harmless, being rarely fatal, except among infants. There will be vomiting and purging, with violent intestinal pain and cramps, faintness, and a tendency to nervous shock. Encourage rather than check the clearing out of the system, which is an effort to get rid of some irritating matter, apply hot poultices or stupes to relieve the pain, and recovery will usually be spontaneous. Keep the extremities warm, and stimulate moderately if required. Give but little and light food, only gradually returning to solid diet.

Intestinal colic is most commonly caused by constipation and flatulence. The pain is of a severe and griping character, distinguished from that of peritonitis by the fact that it is relieved by pressure, while the latter is increased by it. The characteristic pulse and temperature of peritonitis are absent. A clearing out of the bowels, which is most safely and promptly accomplished by enema, will usually afford entire relief. A hot drink, hot applications externally, and massage of the abdomen may be helpful.

Hepatic colic is a more serious trouble, due to the presence of a gall-stone in the biliary duct. An agonizing pain comes on in the upper part of the right side of the abdomen producing nausea, faintness, and profuse perspiration. The attack will only subside when the obstructing stone passes on into the intestine; hypodermic injections of morphine, and hot fomentations sprinkled with laudanum may be used to alleviate the pain. These attacks result from a diseased condition of the liver, and are often followed by jaundice. This is marked by a yellow tinge of the skin and the whites of the eyes, while the bile is evident in the urine and the perspiration, but conspicuously absent from the stools. Great depression of spirits, loss of appetite, nausea, and often extreme itching of the skin accompany jaundice.

Diabetes mellitus is an affection characterized by an excessive flow of urine containing glucose, or grape sugar, an ingredient never found in any considerable quantity during health. The condition comes on by degrees, is more frequent among men than women, and at middle age, although children are subject to it. The symptoms are extreme thirst and abnormal appetite, especially for sweets, but loss of flesh and strength, a dry skin, furred tongue, bad breath, and intestinal disorders. Is most

alarming when complicated by lung troubles. The chief treatment is by dieting. Everything containing sugar, or starch, convertible into it, should be prohibited. The doctor will give you a list of the allowable articles, and you will have to see that your patient does not get sugar surreptitiously. He should have regular exercise, and take special care about catching cold. The disease is chronic in its course, but usually terminates fatally. Injuries and acute diseases are more than ordinarily dangerous to a diabetic subject.

"*Bright's disease*" is a generic term including several varieties of kidney trouble, presenting albumin in the urine. The condition described as acute Bright's disease commonly results from taking cold, or as a sequel of scarlet fever, diphtheria, or rheumatism. It not infrequently arises during pregnancy. The urine is frequently passed, but diminishes in quantity and becomes albuminous, often containing also microscopic casts. There is a peculiar waxy complexion, and a general dropsical condition, evident at first about the eyelids and in the feet. Headache, gastric disorders, and general debility may be looked for; bronchitis and heart-disease are frequent complications. Suppression of urine may follow, leading to death by uræmic convulsions or coma, or the disease may terminate in recovery or lapse into a chronic form. The danger is great. The waste product must in some way be carried off; for this purpose the skin is excited to action, the bowels are kept open, and diluent drinks and diuretics given. Hot-air baths are often prescribed, and sometimes a skimmed-milk diet. Only the most digestible food can be allowed, and that must be given with the utmost regularity.

Renal colic has symptoms not unlike those of hepatic colic, except that the pain takes its origin in the kidney.

It is usually the result of a stone in the kidney or ureter. The urine may be retained or discharged frequently, a few drops at a time. It often contains blood or crystalline deposits of diagnostic value, and should always be saved for examination. The pain can only be relieved by hypodermics of morphine. Hot applications or a hot bath may be given. Urinary calculus in the bladder may be treated by surgical operation.

The skin, like the other organs, is liable to various diseases, most of them either of nervous or parasitic origin. Those of the latter class are always contagious.

Erythema is the name given to an inflammatory condition of the skin marked by redness, with slight swelling, burning and itching sensations. When the erythema is general, it is sometimes called "rose rash," and bears a close resemblance to the rash of scarlet fever or measles, for which it is often mistaken. It is, however, not contagious nor serious, though uncomfortable. It may be the result of indigestion or a chill, and is often associated with rheumatism. A warm bath and a cathartic will hasten its disappearance. Local erythema is usually occasioned by some irritant, and will subside when the cause is removed. The itching may be allayed by a solution of bicarbonate of soda or vaseline.

Urticaria, or "nettle rash," shows patches of white spots on a red ground in various parts of the body, with severe itching. It is produced by irritation, indigestible food (in some people by fish or strawberries), by certain drugs, and even occasionally by strong emotion. It may be treated by the application of tincture of benzoin, diluted one half. Of course, the exciting cause, if known, must be removed.

Eczema is a form of eruption less transitory and far more difficult to deal with. There are various forms of

it, acute or chronic. The most characteristic manifestation is a raw surface with moist exudation from broken-down vesicles, more or less covered with dry crusts. Before any curative treatment will be of service these crusts must be softened with oil (vaseline is the best to use), and gently removed. The part affected may then be cleaned with soft potash soap, and healing ointments applied. Washing with ordinary soap and water should be avoided as well as scratching or any friction.

Herpes is a vesicular eruption of which there are several forms. *Herpes zoster*, or "shingles," is the one most generally known. This appears on the chest, extending just half-way round from the spinal column to the sternum, and is almost always confined to one side. The eruption is preceded by pain of a neuralgic character, which may continue even for some little time after the vesicles have disappeared. Soothing applications may be made, but the disease is self-limited, and will terminate in a few days without treatment.

Scabies, the "itch," is due to a small animal parasite which burrows under the skin and sets up a peculiarly irritating inflammation. It begins usually between the fingers and toes, but may spread to other parts of the body and become quite general. It most frequently occurs in children, though not limited to them. It is commonly treated with ointments of sulphur. It is highly contagious, and persons affected with it should be isolated until it is cured, and their clothing should be afterward disinfected by fumigating with sulphur.

Pediculi, lice, produce a papular eruption accompanied by constant itching. They are of three varieties—one sort peculiar to the head, one to the hair of other parts, and a third which infests the body and conceals itself in the under-clothing. The usual treatment for

them all is with mercurial ointments, but there is some danger attending their use. Lice can not live in any kind of grease. Vaseline liberally applied will kill them, and is a simpler and safer application, especially for children. The nits, or eggs, as well as the lice themselves, must be thoroughly cleaned out to avoid a return of the trouble, and where body lice are found the clothing should be thoroughly baked.

Among the most serious affections which we are liable to meet are diseases of the brain and nervous system.

Paralysis occurs in several forms. Hemiplegia, paralysis of the lateral half of the body, is usually the result of apoplexy—rupture or obstruction of some blood-vessel in the brain. A person in apparently good health may be suddenly attacked with pain in the head, and usually loss of consciousness. One side will be found helpless and without sensation. There may be gradual restoration, or coma and death. With paralysis on the right side there may be aphasia, loss of the power of speech, or the use of wrong words. Mental confusion, lapsing into imbecility, may follow. The attacks tend to recur, and the patient rarely survives more than two or three of them. Paraplegia is paralysis of the lower half of the body on both sides, in consequence of injury or disease of the spinal cord. There will be loss of voluntary motion and sensation below the point affected, and loss of control over the excretions. Remarkable elevations of temperature sometimes occur, and there is a very marked tendency to the formations of bed-sores. Complete or partial recovery may take place, but more often there is a gradual spread of the inflammation, resulting fatally. Neuritis is a form of paralysis due to inflammation of the spinal nerves. It may be a consequence of

chronic alcoholism or lead poisoning or a sequel of some other disease. The trouble comes on gradually, commencing with pain and tenderness in the limbs with increasing loss of power until a condition of complete helplessness is reached. The intelligence may be obscured, the appetite and digestion impaired. Recovery may be looked for if treatment is begun sufficiently early. In alcoholic cases, total abstinence must be enforced. Mental derangement may occur, but is usually only temporary. Liberal diet is important. Massage and electricity are usually employed. There may be local paralyses, wasting and failure of particular groups of muscles from various causes, most often treated in a similar way. Paralyzed parts must be kept always warm, clean, and free from pressure. In all these cases, good nursing is of the utmost importance, and much skill as well as infinite patience is called for.

Neuralgia is severe and paroxysmal pain in a nerve, unaccompanied by inflammation. Hemicrania and sciatica are two of the most common and distressing varieties of it. The causes are numerous, and in treatment must first be considered, The general state of the health is important, neuralgia being most frequent in anæmic subjects. Local applications of dry heat are perhaps as useful as any general remedy that can be named.

Locomotor ataxy is a disease of the spinal cord, distinguished by inability to control the movements of the legs in walking; they are thrown forward in a peculiar jerky way. It is accompanied by severe pain in the limbs and abdomen, constipation, and bladder troubles, often impairment of sight and sensation. The disease comes on by degrees, and is chronic, with very slow improvement, if any. Complete cure is rare.

Cerebral meningitis is an inflammation of the mem-

branes of the brain. This may spread from disease of adjoining parts, occur as a complication of the infectious fevers, in consequence of alcoholism, tuberculosis, injuries of the head, or other causes. The leading symptoms are high fever, violent headache with intolerance of light and noise, vomiting, obstinate constipation, irritability, insomnia, and delirium, often terminated by convulsive attacks, coma, and death. Recovery may be hoped for, except in the tuberculous form of the disease, but all inflammatory affections of the brain are very dangerous. The patient should be kept in a darkened room, as quiet, cool, and free from excitement as possible. The head may be shaven, and ice-cold applications made to it. Leeches are sometimes employed. The bowels must be cleared out. Cold fluid food may be given. Somewhat similar symptoms, but less acute in their course, may be occasioned by the presence of a tumor or abscess in the brain. The symptoms in both cases are variable and often obscure.

Chorea, "St. Vitus's dance," is a nervous affection, occurring most frequently in young girls, sometimes brought on by fright or excitement, and often associated with rheumatism. It is characterized by lack of control of the muscular movements, affecting one or both sides of the body, with general debility, and often mental weakness. The twitching and jerky motions are increased by any excitement, and by the consciousness of being under observation. They cease during sleep. In young persons the attacks tend to recur, but the disease is usually curable. In adults it is more serious; the severe attacks may lead to a condition of mania, or terminate in death from exhaustion. Bed-sores are a common complication. Complete rest and nourishing food are essential in the treatment. Laxatives may be needed—

there is usually a disordered condition of the stomach and bowels—and tonics are thought useful.

Hysteria is the name given to a disordered state of the nervous system, more common in women than in men, though not entirely confined to them. It is often associated with ovarian or uterine troubles. Hysterical phenomena are infinitely varied. There is scarcely any disease the symptoms of which it may not simulate. The patient is morbidly emotional, and exaggerates her symptoms more or less intentionally, but it should be remembered that at the basis of all the imaginative and simulated manifestations is a real, though perhaps obscure, malady. Hysteria is not, as sometimes appears, imposition pure and simple, but the patient is to some extent irresponsible from defective will-power. It may lead to the verge of insanity. There are two forms, the one continuous, the other paroxysmal. Common symptoms are a sensation as of a ball in the throat, a dry cough, very abundant and light-colored urine, flatulence and borborygmi. Neuralgia, local paralyses, rigid contractions of joints, and loss of voice sometimes occur. Hygienic treatment is of great importance, exercise, healthful food, and regular habits being more important than medical treatment. Narcotics and stimulants should especially be avoided. Hysterical fits need no treatment, and will terminate more quickly without it. The patient never hurts herself if left alone.

All neurasthenic patients make heavy demands upon a nurse, and they are often very trying cases to deal with. Various phases and degrees of nervous exhaustion are met with. Many cases have been successfully treated without medicine—by rest, seclusion, dieting, together with massage, electricity, and sponge baths; but for this a nurse needs special experience. No one should under-

take to practice massage without having received thorough instruction, still less to give electricity unless as distinctly directed. That the doctor will occasionally leave the manipulation of a battery to an intelligent nurse does not qualify her to set up as an electrician. Electricity is a powerful agent, requiring the greatest care in its management.

Insanity includes various forms of mental unsoundness, from acute mania and melancholia to dementia, idiocy, and imbecility. The care of insane patients requires special training, added to much tact and good judgment. With a patient of unsound mind it is never safe to be off one's guard for an instant, but there should be as much freedom from restraint as is compatible with safety. Delusions and hallucinations of all kinds are met with which can never be argued away, and need to be judiciously treated. The care of such patients is very different from ordinary sick-nursing, and is best provided for in a suitable institution.

Delirium is a temporary mental aberration occurring in the course of fevers and exhausting diseases. It is apt to come on or be increased at night. Delirium may be quiet, or active and violent. The delusions, like those of the insane, should be as far as possible humored. Opposition only irritates and does harm. The nurse must be invariably kind and gentle, but at the same time firm and vigilant. In violent delirium restraint must be effectual, or it only aggravates the trouble. A dry sheet put on like a pack will take the place of a straight-jacket if needed, but with proper attendance physical restraint is seldom necessary, and should be avoided when possible. Avoid every appearance of fear; keep the room quiet and dark.

Delirium tremens is a peculiar type, the result of

chronic alcoholic poisoning. It is marked by a nervous tremor, great anxiety and restlessness, and horrible hallucinations. Insomnia and suicidal mania are common. The pulse is feeble, the skin cold, and often bathed in perspiration, the pupils minutely contracted, but with no intolerance of light. The nervous prostration and inability to take food may become extreme, and the case may end fatally, or it may terminate with profound sleep and spontaneous recovery. Sleep must somehow be induced; the bowels must be kept open, and nourishing food given, even if by force.

In any case where it is necessary to give food by force the best way of administering it is through the nose, the patient either lying down or sitting up with the head thrown back. A soft, well-oiled catheter is introduced through the nostril into the œsophagus, and connected with a small funnel into which the food—of course fluid only—is poured. It should be introduced at least fifteen inches to make sure that it has passed the entrance to the windpipe. After once entering the œsophagus, it will be helped down by the action of the constrictor muscles. There is less danger of getting food into the trachea by this method than by the use of a stomach-tube passed through the mouth. Holding the nostrils to try to make a patient swallow is always attended by some danger.

Diphtheria is a form of blood-poisoning, often resulting from imperfect sewerage. It is first manifested by feverishness, symptoms of a cold, difficulty in swallowing, and swelling of the tonsils, followed by an exudation of false membrane in white patches on the throat. The discharge from the mouth and nostrils is likely to be abundant; it should be wiped away on soft cloths, which are immediately burned, as it is highly infectious. Take every precaution against infection, and follow all

orders to the letter. Give plenty of fluid nourishment. Nutritive enemata may be necessary. The patient may be choked by the obstruction of the throat, but there is equal danger of paralysis of the heart, which may occasion a fatal termination, even after convalescence from the disease is well established. The horizontal position must be maintained for a long while. Tracheotomy is sometimes resorted to, but there is danger that the membrane will continue to form below the point of incision. Intubation is now considered preferable.

Asiatic cholera is a specific infectious disease, communicable by means of the excreta. It is characterized by violent vomiting and purging, with so-called "rice-water evacuations," cramps, extreme prostration, and collapse. It usually commences with slight diarrhœa and nausea, and, wherever the disease prevails as an epidemic, these symptoms should receive prompt attention. If it progresses, there is intense thirst, restlessness and muscular spasm, the pulse becomes rapid and weak, the temperature falls below normal, the skin becomes livid, the eyeballs sunken, and a generally ghastly appearance precedes death by collapse. The mind is usually clear to the last. The first endeavor is to control the purging, for which opium is usually given. Keep the patient in bed and warm. In all cases of diarrhœa, especially in cholera, insist on the recumbent position. Give ice *ad lib.*, but little water; food strictly as directed. Nutritive enemata may be necessary. The stools, vomited matter, and urine, must be disinfected most thoroughly and disposed of promptly, and all possible precautions taken against the spread of the disease.

Typhoid, or *enteric*, *fever* is due to a poison associated with certain forms of decomposing animal matter, and is characterized by a catarrhal inflammation

of the mucous membrane of the small intestine, with ulceration in certain spots, called "Peyer's patches." It is most common in early adult life, and during the latter part of the year. It may occur as an epidemic, in which case there is some common cause to be looked for and remedied, most often impure drinking-water. The period of incubation is from two to three weeks, the usual duration from three to four weeks, dating from the first rise of temperature.

The attack most often comes on gradually, beginning with dull headache, loss of appetite, general malaise, sometimes nausea and slight diarrhœa, and nose-bleed. The patient may not go to bed till the fifth or sixth day, though the fever steadily increases during the first week, having a remittent type, falling in the morning, but rising every night a little higher, till it gets up to 103° or 104.° By this time there is violent headache, intolerance of light, and, perhaps, slight delirium, parched lips and tongue, abdominal tenderness and tympanites. During the second week the fever remains continuously high, and an eruption of rose-colored spots may appear on the abdomen and chest. These are slightly elevated, and disappear upon pressure, to return again immediately. Each spot remains visible for three days. Successive crops may appear for ten or twelve days. The headache is less during the second week, the bowels are likely to be relaxed, the motions of a light ochre or "pea-soup" color. In severe cases, the patient assumes a characteristic typhoid appearance, the face dusky and indifferent, the muscular prostration evidently extreme, the mental condition one of stupor, varied by active delirium. The tongue is brown, dry, and heavily coated; sordes collect on the teeth. During the third week the fever again becomes remittent, falling toward morning,

though rising at night. The general typhoid condition deepens, the pulse becomes frequent and feeble, the emaciation and loss of strength rapid. This is the period of greatest danger. By the beginning of the fourth week there should be evident improvement, the fever becoming intermittent, and the evening exacerbations decreasing, the tongue clearing off, and the tympanites disappearing. There will now be a return of the appetite and natural sleep. Constipation is common. When the temperature keeps a steady normal, convalescence may be regarded as fully established. The strength begins to return, and the appetite becomes sharp. Convalescence is always slow, and likely to be complicated. There may be relapses, usually milder than the original attack, and of shorter duration, but running a similar course. The greatest danger in typhoid is that of perforation of the bowel by the intestinal ulcers, and consequent acute peritonitis. The symptoms of perforation are severe pain, increased by pressure, rapid distention of the abdomen, rapid, feeble pulse, and other signs of collapse. It is usually fatal within twenty-four hours. Intestinal hæmorrhage may occur without perforation, from the rupture of an artery in some ulcer. It is usually preceded by a sudden fall in temperature. It may be serious enough to be fatal, without any external escape of blood. The treatment consists in absolute rest, the application of an ice-bag to the abdomen, and semi-narcosis by opium.

In no case is good nursing of more vital importance than in typhoid fever. There must be constant watchfulness and care from the beginning until complete recovery. The recumbent posture must be strictly maintained until the intestinal ulcers are perfectly healed. The diet must be rigidly in accordance with the doctor's

directions, even after the patient feels quite well. Many deaths occur from indiscretion or overexertion during convalescence. There is no specific treatment; little medicine will be given; everything depends upon hygienic precautions and economizing the patient's strength until the disease is exhausted. The patient must be kept clean and dry—there is great danger of bed-sores with the extreme emaciation—but in no way fatigued. Wash the mouth and teeth several times daily, and give cold water in small quantities even if not asked for. Keep the temperature of the room low while the fever is high. The stools need to be disinfected with the same care as those of cholera, for the poison passes out in them, and is readily communicable.

Typhus fever resembles typhoid only in name. It is a highly contagious disease, associated with overcrowding and bad ventilation. The attack is usually abrupt, beginning with a chill, followed by a temperature of 105° Fahr. or more, with violent headache and extreme prostration. The rash appears toward the end of the first week, showing first on the sides of the abdomen in dirty-pink or purplish spots. When abundant, it is described as "mulberry rash." Each spot persists until the disease terminates in convalescence or death. The head is much affected; violent delirium occurs, or in some cases coma-vigil. The disease, unless it terminates fatally, usually runs for fourteen days, after which the amendment will be abrupt, as was the onset. Relapses are rare The patient's strength must be saved in every possible way, the aim being to sustain the vital powers until the fever abates. Watch every moment during the delirium. Keep ice-bags on the head. The sleeplessness must be relieved, and nourishment must be given, if by force. Quarantine strictly. Ventilation is

especially important, as the poison is thrown off most virulently from the lungs and skin. Fresh air is the best remedy, regardless of cold.

Scarlet fever has a period of incubation anywhere from two to ten days. It begins with headache, nausea, sore throat, pains in the limbs, rapid pulse, and rise of temperature, more rarely with chills or convulsions. The eruption generally appears on the second day—rarely later—beginning on the chest, a bright efflorescence, rendered pale by pressure, but immediately returning. It is most distinct on the back and at the bends of the joints. The danger is somewhat proportionate to the darkness of the eruption, but there is a very malignant variety, rapidly fatal, with no eruption at all. The rash lasts from four to six days, and as it declines desquamation sets in. This is the most infectious period, and the isolation must be complete until it is fully over, and even for a week later. The most severe cases may follow exposure to a light one. With high fever may be the characteristic "strawberry tongue" and sore throat, occasioning difficulty in swallowing. The tonsils sometimes ulcerate. Hot applications about the throat may relieve it. Various complications are common, and there is no disease in which there is greater liability to troublesome sequelæ. Kidney troubles, rheumatism, diphtheria, inflammation of the joints, and deafness from the ulceration extending into the Eustachian tubes, are all likely to attend or follow it. The greatest care should be taken not to let the patient get chilled during convalescence; the skin is especially sensitive while desquamation is going on, and if its action is suddenly checked, the extra work thrown on the kidneys is almost sure to induce congestion of those organs. Even the lightest cases should be kept in bed, and protected

from the least exposure. However well the patient may appear, watch the urine carefully, and test it now and then for albumin. Should it become scanty, smoky, or contain a trace of albumin, it is an indication of danger. Note whether the eye-lids or limbs swell, and if there is any difficulty in breathing. If diphtheritic trouble is impending, there is likely to be free discharge from the nose. Very little medication is now employed for these cases. Keep up good sanitary conditions, fresh but not cold air, food as directed. Cold water may be given freely. During desquamation, the body may be sponged off frequently with tepid or warm water, and rubbed with carbolized vaseline or cacao-butter to allay the irritation. Scarlatina is not, as commonly supposed, a lighter form of the disease, but merely its Latin name.

Small-pox, or *variola*, begins with great severity from nine to fourteen days after exposure, usually with a chill, followed by high temperature, rapid pulse, general feeling of lassitude, severe pains in the back and legs, vomiting, sore throat, tongue white and furred. The rash appears on the third day, in small spots like flea-bites, first on the face and neck, along the edges of the hair, then extending downward. When the rash comes out the febrile symptoms subside. The pimples become vesicular, showing a depression in the center, and about the fifth or sixth day suppurate. With the suppuration the high fever returns, often preceded by a chill. The vesicles have a marked and characteristic odor. They increase in size, and may become confluent, running together, or remain discrete, distinct. The confluent variety is by far the most dangerous. By the ninth day they reach their full size and burst, or crust over, and desiccate. The secondary fever then subsides, and convalescence is established.

Another high rise of temperature would be suggestive of some complication. The danger in small-pox is greatest at the beginning of the suppurative fever. The more abundant the eruption, the greater the danger. The pain attending the eruption may be relieved by hot fomentations. When the vesicles begin to be prominent, they may be pricked and bathed with some weak disinfectant solution. On the palms and soles, where the skin is thick, they should be opened early. During desiccation, sponge with warm water and oil the surface freely. Ventilate well. Keep the room dark, and its temperature down to 60°. If there is delirium, apply ice to the head. Children must be kept in gloves. The throat may be so inflamed as to render swallowing difficult. But try to keep the patient's strength up, and his temperature down, and isolate completely. He must not come in contact with others till every trace of a scab has disappeared. Infection may take place during any stage, even that of incubation. Vaccination, properly performed, is perfect protection. Varioloid, a modified form, may result from exposure after vaccination, running a similar course, but milder, and of briefer duration.

Inflammatory rheumatism, or acute rheumatic fever, usually results from exposure to cold and damp. It may possibly, when latent in the system, be developed by malarial poisoning. The fever often runs high before the local symptoms appear. These are heat, redness, swelling, and intense pain in one or more joints, having a tendency to shift about from one spot to another. There is profuse perspiration, having a characteristic odor. The urine is likely to be scanty, high colored, and strongly acid. Nervous disorders and mild delirium at night may accompany severe cases. The

greatest danger is of cardiac complication. A horizontal position should be maintained, and the patient lifted as little as possible, as the slightest motion is agonizing. He should be kept warmly dressed in flannel. The bowels should be kept open, and only light and digestible food given. Avoid all excitement, and in no case give stimulants except under the doctor's direction.

In giving stimulants in fevers, note the following points: If, after taking, the tongue and skin become moist, the pulse steadier, the breathing more tranquil, if delirium is quieted, and sleep induced, they may be recognized as helpful, and their use continued if called for. If the reverse effects follow, the skin and tongue becoming dry, the pulse quicker, the breathing hurried, they are doing harm, and should be stopped.

Malarial, or *intermittent*, *fever* is a non-infectious fever of an endemic type, usually originating in marshy regions. The most common form of attack exhibits three stages. The patient is first seized with a chill, more or less violent and prolonged, during which, though he feels cold, his temperature will be found to be rapidly rising. Severe headache, nausea, and pains in the limbs often occur. The feeling of chilliness passes away, and is succeeded by a hot stage. The temperature keeps up, the face is flushed, the skin hot and dry. Finally, perhaps after several hours, profuse sweating ensues, during which the temperature falls and the other acute symptoms subside. These attacks occur periodically, with intervals of fairly good health. Constitutional treatment is called for, and sometimes change of climate. During the chills the nurse can do something to alleviate the discomfort by the use of warm blankets, hot bottles, etc., and during the fever by tepid sponging and cooling drinks.

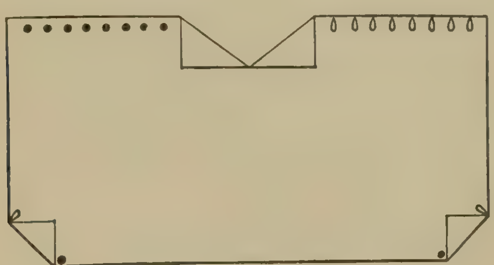
CHAPTER XXIV.

The terminations of disease—Care of convalescents—Clothing—Visitors—Preparations for the night—Death—Signs of approach—Condition of body after death—Preparations for burial.

Disease may terminate either by cómplete restoration to health, by subsidence into a chronic form, by a lapse into some other disease, or by death. When the seat of disorder is suddenly transferred from one part of the body to another, the change is called metastasis. Convalescence may be abrupt or gradual, it may go on steadily, or be delayed by complications or interrupted by relapse. Sudden convalescence is most common in nervous affections, while in nearly all acute diseases it is established by gradual resolution.

The care of a convalescent is not the least wearisome kind of nursing, although it does not involve the hardest work. You miss the exciting interest which sustained you during the crisis of danger, yet, even if you are already fatigued, your watchfulness must not be relaxed, for the patient will be left more than ever to your responsibility, while he is more likely to risk imprudence and relapse. Convalescents are very apt not to realize their own weakness, and to want to do more than they are really able. You must see that they do not overexert themselves in any way. A patient beginning to improve will at first be allowed to sit up

in bed, then may be lifted to a easy-chair or a sofa for a short time—perhaps an hour at first—gradually in creased each day. Then he may walk across the room, or into the next room, and be taken out for a quiet drive on a bright day. The time when an invalid is first allowed to leave his bed is one when special care is required. All the clothing should be well aired and warmed. If the patient has something bright and pretty to put on, it will make him feel better, though anything elaborate and difficult to get into is objectionable; everything should be loose, easy, and not cumbersome. A wrapper with a heavy train will be enough of a burden to fatigue a feeble woman and prevent her from walking as much as she otherwise might. Walking is less fatiguing than standing. The room should be warmer than when the patient is in bed. Let him sit where he can see the fire, unless the eyes are weak, but not too near. To provide against a draft under the legs, put a blanket in the easy-chair, reaching well to the floor, which can be folded up over the feet. A footstool is always desirable.



Nightingale.

When the patient only sits up in bed, some extra covering will be needed about the shoulders and chest.

For this purpose a loose flannel jacket is much better than a shawl, as it does not confine the arms or slip off. The "Nightingale" wrap is a very convenient and easily adjusted shape. For this, two yards of flannel of the ordinary width are required. Cut a straight slit six inches deep, in the middle of one side, turn back the points so formed for a collar, and those of the corners farthest from it for cuffs; bind or pink it around the edges, and add buttons and button-holes, as illustrated in the diagram. It can be made as ornamentally or as simply as desired.

The patient, upon first getting up from an acute disease, should not be allowed to receive visitors, as the unwonted exertion is in itself as much of an excitement as is safe. It is best to have no one in the room but yourself and your patient, unless you need an assistant.

You should have full authority on the question of visitors, and it will be often your duty to protect the patient from his friends. Do not let him feel obliged to receive every one who calls. An invalid can always be politely excused. Some visitors will be unobjectionable, and even good for him, while others, with equally kind intentions, will do all the harm possible. Do not let anybody stay too long, nor admit too many at a time. Three in succession will be less wearisome than two at a time, who claim divided attention. Provide a seat for the visitor, facing the patient, so that he can see and hear without effort. Do not give the patient's easy-chair, nor let the visitor stand at the foot of the bed, or lean against it. A small table at the foot of the bed, with a few things on it, is an excellent arrangement to prevent this, and to keep people from taking hold of the bed and jarring it as they pass.

See that visitors do not smuggle in contraband articles. It is not only in hospitals that there is danger of this, though it is a most common trouble there. You may find all your work undone by some injudicious gift which you only discover too late. A handful of fresh flowers, a new picture, or some pretty decoration for the room, is always a better token of remembrance to send an invalid than delicacies to eat, which are very likely to be unsuited for him.

No visitors should be admitted after dark, as a rule. As night approaches, you should try to get the patient into a quiet, unexcited state of mind. It is not advisable to hush every sound as soon as he drops asleep, for absolute quiet is very hard to maintain, and slight noises will be less likely to disturb him if he is accustomed to sleep through ordinary sounds. If you are obliged to wake him, do not rouse him suddenly or sharply. You will seldom have occasion to do it at all. You should not wake a sleeping patient for anything unless by special orders. In the great majority of cases, healthy sleep is a better restorative than any you can administer. This does not apply to the insensibility of stupor.

Before settling down for the night, see that everything likely to be needed is where it can be readily found. Have food and fuel enough to last through the night; matches and a candle at hand, if a night-light is not kept burning. In the latter case, see not only that the light is carefully shaded, but that there are no reflections of it to shine in the patient's eyes. Dress yourself for the night in a warm wrapper, not a shawl. and easy, noiseless slippers. A nurse should be warranted not to snore.

If the patient expresses any wish to see a clergyman or a priest, he should be sent for, especially if there

is any apprehension of death. If he is very sick, it is no time for religious exhortation, and any excitement should be avoided; but, if the clergyman has any tact and sense of propriety, his visit may be a comfort to the patient, as well as to his friends.

The friends of the dying might be spared much anxiety if they realized how seldom the severance of soul and body is attended by any agony. To many a weary sufferer death comes as a glad release from the burden of pain, and even where the patient has clung to life, and seemed to fear the end, it comes almost always peacefully and painlessly. Death itself—the last ebbing of the vital force—is not painful, even though intense suffering may have preceded it. Death-bed scenes are rarely either edifying or agonizing, though always solemn.

Death approaches through one of the three vital organs, the heart, lungs, or brain—by asthenia, apnœa, or coma. Among the signs of approaching dissolution are coldness of the extremities, a certain sharpness of the features, a dusky shade about the face and finger-nails, cold perspiration, restlessness, and muscular twitchings or stupor.

Do not unnecessarily alarm the friends; but, when you are sure that the end is near, it is best that they should be informed. Disturb the dying as little as possible, though you must not give up working while there is the slightest ground for hope. Note the exact time at which death takes place, and take care not to announce it prematurely. The failure is sometimes so gradual as to lead to error in this respect. In a hospital, the attending physician, if not present, must be notified at once. After a few hours there can rarely be any doubt whether or not death has taken place. The

only condition at all likely to be confounded with it is that of catalepsy, which is most often associated with hysteria.

Shortly after death there may be a high rise of temparature, produced by chemical changes within the body; but it soon assumes the temperature of other inanimate objects, and the *rigor mortis* sets in—a peculiar stiffening of the muscles. As a rule, the sooner it comes on, the quicker it disappears, leaving the limbs quite lax. Before it takes place, the body should be prepared for burial. Wash it with a weak solution of carbolic acid, or chlorinated soda, close the eyes, arrange the lips naturally, and smooth the hair. If there is any difficulty in keeping the eyes shut, put a tiny wisp of cotton upon each eyeball under the lids. This will keep them from slipping. To keep the mouth shut, put a firm wedge under the jaw, resting in the hollow of the throat, not a bandage about the head, which is difficult to adjust, and always leaves marks of pressure. After the jaw is firmly set, the wedge can be removed. Straighten the limbs, tying the feet together with a broad tape or a bandage. Pack all the orifices of the body with absorbent cotton, or coarse salt, to prevent discharges, and bind a cloth firmly around the hips, putting it on like a child's diaper. Over this can be any clothing desired; a clean night-dress or a simple shroud is more suitable than anything else. Cover face and all with a sheet. If the death occurs in a hospital ward, all this must, of course, be done behind screens. Do not send for the stretcher to remove the body until every thing is quite ready, and then have it taken away as quickly and quietly as possible. Have the door of the opposite ward closed. See that the patient's name is on the shroud.

In a private house, the final arrangements will all be put into the hands of an undertaker, but it is quite likely the friends will wish you to superintend them, and perhaps even lay out the body. If it is to be kept for any length of time, it must be packed in ice. After twenty-four hours on ice, the body assumes a much more natural appearance. Any slight discolorations can be made less conspicuous by dusting them over with toilet powder. After the body has been taken out, the room must be put in order, all the appliances of sickness removed, the bedding sent out to be disinfected, and the windows left wide open for twelve hours.

CHAPTER XXV.

Groups of food material—The process of digestion—Preparing and serving food—Feeding helpless patients—Water and ice —Milk—Animal broths—Gruels, etc.—Receipts.

All animal bodies are made up of the four elements, oxygen, hydrogen, nitrogen, and carbon, together with a small quantity of mineral matter. Oxygen and hydrogen, in combination, form water, which enters into all constituent parts of the body, amounting to more than two thirds of its entire weight. Life is maintained by a continual process of oxidation, or combustion, producing heat and energy. To supply material for such production of vital force, and also to build up and repair the waste of the tissues carrying on the work, food is required. Our food, in whatever form we take it, is composed of some or all of the four elements above named, in variously proportioned compounds.

The hydrocarbonaceous compounds, of which starch, sugar, fat, and gum, are the most familiar and most important, furnish the materials for oxidation, whatever surplus may be taken into the system being stored as fat. These may be called the heat-producers.

Nitrogenous compounds are more especially flesh-formers, and go to repair the waste of the body. The most important of them is albumin, and the entire group of related compounds, including fibrin, casein,

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glutin, gelatin, etc., are, from their resemblance to it, frequently termed albuminoids.

Neither group has exclusively the one function, for in the transformation of albuminoids into living tissue some heat is produced; and in all healthy tissue there must be present, also, a certain proportion of the hydrocarbons. But the division is still of value, forming the basis of all scientific dietetics.

In addition to these two great groups of food-matter certain earthy salts are required—phosphorus for the nervous system, iron for the blood, lime for the bones, potash and soda for the muscles, etc. These we take insensibly, they being more or less in nearly everything we eat and drink. Common salt (chloride of sodium) is the only one which we make a practice of adding to our food.

Hydrogen and carbon very readily unite with oxygen; it is a peculiarity of nitrogen, on the contrary, that it interferes with oxidization. Entering into the composition of the bodily tissues, it protects them, so that they are not rapidly consumed by the heat of the oxidizing hydrocarbons. Their destruction is generally slow, and the amount of nitrogenous matter needed for repair is much less than the amount of hydrocarbons called for as fuel. In a healthy diet—that is, one in which the supply corresponds to the demand—the heat-producers should be more abundant than the albuminoids. In growing children and in convalescents, where disease has caused undue waste of substance, the demand for albuminoids is greater.

Even in health it is well to know something of the constituents of our food, and what purpose each serves in the economy of nature; and, when sickness and its effects upon digestion and nutrition are to be taken into

account, it becomes worthy of the most serious consideration. The original meaning of *nurse* was to nourish, and, in spite of all the secondary meanings that it has acquired, the question of nourishment still remains one of primary importance. What food to give, when and how to give it, are constantly recurring problems of the sick-room.

What kind of food is to be given in each case will usually be decided by the physician; how best to prepare and administer it are matters for the nurse to know. Everything should be the best of its kind, well cooked, palatably seasoned, and attractively served. Consult, as far as possible, the known tastes of the patient; but do not each time ask him what he would like. Something unexpected will often be acceptable, when to have thought about it beforehand would have taken away all appetite for it. His food should never be prepared in his presence, nor the smell of cooking be allowed to reach him, if it is possible to avoid it. Your own meals should never be served in the sick-room; it is equally bad for nurse and patient. Serve everything as nicely as may be, always with a clean napkin, spotless china, shining silver and glass. Have the dishes dry on the outside, taking particular care that nothing gets spilled from the cup into the saucer. This point needs special emphasis.

Have hot things very hot, and cold ones really cold. More salt and less sugar will generally be wanted than in health. Highly seasoned food is not good or often wished for, but everything should be agreeably flavored and of good quality: eggs above suspicion, milk always sweet, and butter fresh. The two articles last named ought always to be kept cool and closely covered, for they absorb the odors of whatever is near them. The

least taint in any kind of food should lead to its rejection, and the substitution of something else. Before taking food to the sick, you should always taste it to be sure that it is just right, but on no account taste it in his presence, or with his spoon. Whatever is not eaten should be at once taken away, as to leave it in sight, in the hope that he will want it a little later, is worse than useless. It is always better to bring too little rather than too much.

A weak digestion can not manage a load, but must take little and correspondingly often. It is not wise to overburden the patient's stomach in your anxiety to make him take plenty of nourishment, for it is not what is swallowed, but what is digested, that does him good. When only a very small quantity can be retained, it should be in a highly concentrated form. Where there is nausea and diarrhœa, give but little at a time, and always cold.

Ascertain from the doctor how much he wishes the patient to take within the twenty-four hours, and, dividing it up into suitable quantities, give it at regular intervals. The importance of regularity can hardly be too much emphasized. If given punctually at fixed hours, a habit not only of taking, but of digesting it, will soon be acquired, for our most automatic functions are influenced by custom. Each time a patient is fed, a note should be made of the kind and approximate quantity of nourishment taken. Only in exceptional cases should he be roused from sleep for food, but a supply should be provided for use during the night, as it may be most important to have it at hand. Put it in the coolest place, and cover to keep out the dust. Some light nourishment the last thing at night will often help to send the patient to sleep.

In feeding a helpless patient, give the food slowly and in manageable quantities, letting each morsel be fairly swallowed before another is given. If there is difficulty in making him swallow, it will be lessened by taking advantage of his inspirations. See that the head is not turned to either side—even a slight inclination may cause the liquid to run out at the corner of the mouth instead of down the throat—have the clothes well protected, and take pains not to make an external application of it. A feeding-cup with a spout may be used, but, unless the patient is able to control it himself, it has the disadvantage that the nurse can not see how fast she is pouring its contents. Fluid food can in most cases be taken more conveniently by suction through a bent glass tube, and patients will often take a larger quantity in this way than they can be induced to in any other. After feeding, always dry the mouth, especially at the corners, if the patient can not well do it for himself. The lips not infrequently become sore from want of this little care.

With fever, there is often great thirst. Usually it will be quite safe to allow the patient all the water he wants. If not, it is worthy of note that a small glass *full* will be much more satisfactory, especially to children, than the same quantity in a larger vessel. Slightly bitter or acidulated drinks slake thirst more effectually than water alone. Hot water quenches thirst better than cold, though bits of ice are often very refreshing. They may be easily split off with a pin, in the direction of the grain. Small bits *swallowed whole* are excellent to control nausea, but if retained in the mouth until melted, do more harm than good. Sips of very hot water are in most cases more serviceable. Ice, to keep well, must be so placed that the water will drain off as fast as it melts.

Small pieces may be kept in a glass for some time by suspending them in flannel, in which one or two holes are snipped for the water to run through. Confine it by an elastic band about the edge of the glass. A metal spoon in the glass helps to melt the ice by conducting away the heat rapidly. A newspaper wrapped around the ice-pitcher, being, on the contrary, a very bad conductor, will help to preserve it. Ice, to be taken internally, must be clean, and that not only on the outside. It is a great mistake, to think that all deleterious substances are disengaged from it in freezing. It is as necessary to have good ice as pure water, which is of recognized importance. Pure water should be transparent, sparkling, colorless, and odorless, though these characteristics do not prove it such. Water of suspicious quality, can be rendered safe to use by boiling it for half an hour, and letting it cool in closely covered vessels.

To provide food for the sick which will be at once suitable and acceptable is a matter which requires care, judgment, and ingenuity, but it is well worth the expenditure of them all. The aim should be to give what will be at once easy of digestion and of value after it is digested.

Digestion is an elaborate and complex process, including both mechanical and chemical action. The saliva contains a peculiar ferment called ptyalin, which has the property of converting starch into sugar. The gastric secretion acts in a similar way upon the albuminoids, changing them into soluble peptones. The bile, the secretion of the liver, has the power of emulsionizing fats, and the pancreatic and intestinal juices supplement to a certain extent the action of all the three. Whatever portion of the food resists the action of all

these solvents is rejected from the system as waste matter, while such as is reduced to a fit state of solution is absorbed into the circulation. When the gastric secretion is defective, pepsin may be given, with an acid, to aid in the solution of albuminoids; pancreatin, preferably with an alkali, assists in the intestinal indigestion.

Liquid food is the most easily digested, and in severe illness may be entirely relied upon. Meat contains much nutriment in small bulk, but is a good deal of a tax upon the digestive organs. Vegetables contain all the food elements, for, as is well known, life can be sustained on a purely vegetable diet, but they include a large proportion of waste in the shape of indigestible fibrous tissue. The leguminous plants are rich in albuminoids, the cereals and tubers in starch, although wheat contains a large amount of glutin. Fruits consist chiefly of water and sugar, with some vegetable acid, and have but little nutritive value. Milk is the only article of diet which contains in itself all the necessary elements of nutrition in their proper proportions. Tea and coffee are rather stimulant than nutrient. Cocoa and chocolate are more nutritious than either, but unfortunately are somewhat difficult of digestion. Eggs are of high nutritive value, but in them, and in most other animal foods, the albuminoids predominate. Beef ranks high among the animal foods, but the usefulness of beef-tea is very generally overestimated, as the albuminous and most nutritive portion of the meat is left behind in its preparation. It has value, but it is as a stimulant rather than as a food. Preparations of beef which has been peptonized, or partially digested outside of the body, are far superior to it. Beef-juice is now much used. This may be given either hot or ice cold. Frozen beef-juice will sometimes be acceptable when it

is not relished in the fluid form. Animal broths are made from beef, chicken, mutton, or veal. The latter is of the least value. Mutton is useful where it is readily digested, but there is frequent repugnance to it. A meat-tea, good by way of variety, is made by using equal quantities of beef, mutton, and veal. Meat from which the juice is to be extracted must always be put into cold water, and gradually heated. It may be allowed to simmer until the meat has quite lost its color, but should never reach the boiling-point. On the other hand, if the meat itself is to be eaten, it should be in the beginning exposed to a high temperature, which will coagulate the fibrin near the surface, and so prevent the escape of the juices.

All soups should be allowed to stand until cold, as the fat can not be perfectly removed while hot. Heat, when required for use, only to the palatable point, with out further boiling.

A variety of gruels, porridges, and panadas are made of oatmeal, Indian-meal, arrow-root, rice-flour, corn-starch, etc. Different crushed cereals may be obtained already steam-cooked, which will be found excellent and very convenient, as they take little time for preparation. Directions for use are supplied with them.

Both oatmeal and Indian-meal have a loosening effect upon the bowels, and are consequently objectionable when there is any tendency to diarrhœa. In such cases boiled milk is preferable to raw. When there is nausea arising from overacidity of the stomach, lime-water may be added to the milk, in any proportion up to one half. If there is also constipation, carbonic-acid water or Vichy is to be preferred. Skimmed milk can often be taken when the cream can not, and it should

be remembered that this contains all the elements of nutrition. Buttermilk is also good.

Milk may be kept for some time from souring, even in warm weather, by adding to each quart fifteen grains of bicarbonate of soda, and a little sugar.

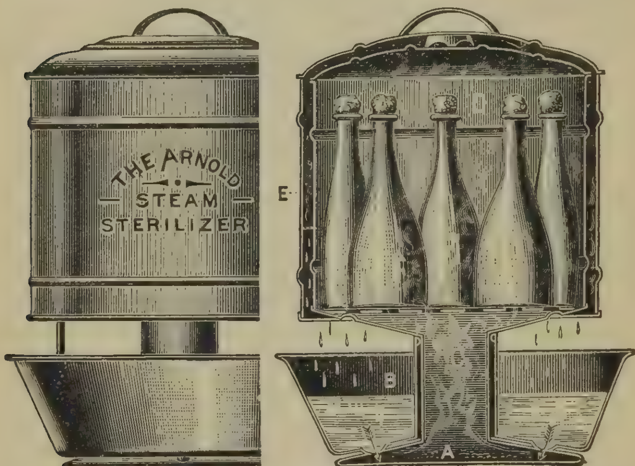
Koumyss is a very nutritious and somewhat stimulant form of food. The original is prepared in Tartary from mare's or camel's milk; but an excellent imitation may be made by fermenting cow's milk. For directions, see receipt No. 23. This is very valuable, and will sometimes be assimilated when nothing else can be retained. Each quart is said to contain four ounces of solid food. Matzoon is somewhat similar.

Although milk is a most healthful and valuable article of diet when fresh and pure it absorbs noxious germs from the atmosphere so rapidly that it is practically impossible to keep it so, even under the most favorable conditions, and it has often proved a source of danger and a vehicle for the transmission of disease.

The recently introduced process of sterilization, however, destroys the fermentative germs and insures against these elements of danger. In all cases where an invalid or an infant is to be fed largely upon milk, it should be subjected to this treatment. The best apparatus for the purpose is the Arnold steam sterilizer, which can be purchased in size suitable for ordinary use for two dollars and a half. This will generate steam from cold water in a few minutes, and can be made useful also for vapor baths, steam inhalations, and general disinfecting purposes.

This apparatus maintains, by means of steam, *a uniform temperature* of 212° Fahr. in every part of its sterilizing chamber. Water is poured into the pan or reservoir, whence it passes slowly through three small

apertures into the shallow copper vessel beneath, becomes converted into steam, and rises through the large funnel in the center to the sterilizing chamber above. Here it accumulates under moderate pressure at a temperature of 212° Fahr. The excess of steam escapes about the cover, becomes imprisoned under the hood, and serves to form a steam jacket between the wall of



The Arnold steam sterilizer for sterilizing milk.* *A*, shallow copper steam generator; *B*, reservoir or pan; *C*, steam funnel; *D*, sterilizing chamber; *E*, hood.

the sterilizing chamber and the hood. As the steam is forced down from above and meets the air, it condenses and drips back into the reservoir.

In the absence of special apparatus, put the milk in ordinary nursing bottles, and plug them tightly with absorbent cotton. Stand them in a kettle of cold water

* Manufactured by Wilmot, Castle & Co., Rochester, N. Y.

either on a wire frame or a folded towel so arranged as to keep them from touching the bottom of the kettle or each other. The water should be deep enough to cover the bottles to their necks. Bring it gradually to the boiling point, and allow it to boil for twenty minutes. Then remove the cotton plugs, cork tightly, and put the bottles away where they will cool gradually. They must remain sealed until required for use. Each should contain only so much as is needed at one time, and any surplus should not be offered again. If the milk is for an infant, let it nurse directly from the sterilizing bottles, substituting a clean rubber nipple for the cork, and warming to the temperature of new milk by standing the bottle in hot water for a few minutes. As soon as emptied, bottles, corks, and nipples, must be most carefully and thoroughly washed, first with a solution of soda and then with clean hot water. Antiseptic cleanliness in every particular is essential to success. Milk perfectly sterilized will keep for a month or more without ice. If it fails to do so, it is certain evidence of some carelessness in its preparation. The corks should be new, and of good quality. It is said that they may be rendered air and water tight by keeping them for five minutes under melted paraffine. Rubber stoppers are better than corks.

The following receipts for sick-cookery are all of tested value, and simple enough to be used successfully by the least experienced in culinary art.

FIFTY FORMS OF FLUID FOOD.

1. *Beef-tea.*—Take a pound of juicy beef cut from the round, remove all the fat, and cut into very small pieces. Put in an earthen pot and add a quart of cold water. Cover it closely, let it soak for an hour, and

then simmer gently for two hours more, or until the strength is quite extracted from the beef. Strain, and season with salt and pepper.

2. *Beef-essence.*—Mince finely a pound of lean, juicy beef, from which all the fat has been removed; put into a wide-mouthed bottle or fruit-jar, and cork tightly. Set the jar into a kettle of cold water over a slow fire, and let it boil for three hours. Strain and season with salt and red pepper.

3. *Peptonized Beef-tea.*—To half a pound of raw beef, free from fat and finely minced, add ten grains of pepsin, and two drops of hydrochloric acid. Put in a large tumbler, and cover with cold water. Let it stand for two hours at a temperature of 90°, being frequently stirred. Strain and serve in a red glass, ice-cold. Peptonized food does not keep well, and should never be used more than twelve hours old.

4. *Beef-juice.*—Place half a pound of lean, juicy beef on a broiler over a clear hot fire, and heat it through. Press out the juice with a lemon-squeezer into a hot cup, add salt, and serve hot with toast or crackers.

5. *Beef-tea with Oatmeal.*—Mix a tablespoonful of well-cooked oatmeal with two of boiling water. Add a cupful of strong beef-tea, and bring to the boiling point. Salt and pepper to taste, and serve with toast or crackers. Rice may be used in place of the oatmeal.

6. *White Celery Soup.*—To half a pint of strong beef-tea add an equal quantity of boiled milk, slightly and evenly thickened with flour. Flavor with celery seeds or pieces of celery, which are to be strained out before serving. Salt to taste.

7. *Chicken Broth.*—An old fowl will make a more nutritious broth than a young chicken. Skin, cut it up,

and break the bones with a mallet. Cover well with cold water, and boil slowly for three or four hours. Salt to taste. A little rice may be boiled with it, if desired.

8. *Mutton Broth.*—Cut up fine two pounds of lean mutton, without fat or skin. Add a tablespoonful of barley, a quart of cold water, and a teaspoonful of salt. Let it boil slowly for two hours. If rice is used in place of the barley, it will not need to be put in till half an hour before the broth is done.

9. *Oyster Broth.*—Cut into small pieces a pint of oysters; put them into half a pint of cold water, and let them simmer gently for ten minutes over a slow fire. Skim, strain, add salt and pepper.

10. *Clam Broth.*—Take three large clams, and let them stand in boiling water till the shells begin to open. Drain out the liquor, add an equal quantity of boiling water, a teaspoonful of finely pulverized cracker crumbs, a little butter, and salt to taste.

11. *Rice Soup.*—Take half a pint of chicken stock and two tablespoonfuls of rice. Let them simmer together for two hours, then strain and add half a pint of boiling cream and salt to taste. Boil up once, and serve hot.

12. *Peptonized Milk.*—Stir up five grains of pancreatic extract and fifteen of bicarbonate of soda in a gill of water; mix thoroughly and add a pint of fresh milk. Put in a bottle or a covered jug, and let it stand where it will keep warm for an hour. Then put on ice until required for use, or boil for two or three minutes to stop further digestive action. Milk so prepared will have a faintly bitter flavor; it may be sweetened to taste, or used in punch, gruels, etc., like ordinary milk.

13. *Flour Gruel.*—Mix a tablespoonful of flour with

milk enough to make a smooth paste, and stir it into a quart of boiling milk. Boil for half an hour, being careful not to let it burn. Salt and strain. This is good in cases of diarrhœa.

14. *Boiled-flour Gruel.*—Moisten a pint of flour with a couple of ounces of cold water, make it into a ball, and tie it up tightly in a strong cloth. Slightly dampen the cloth, sprinkle it with flour, and boil it hard for ten hours. Then take off the cloth, and let the ball dry in a slow oven for ten hours more. Grate two teaspoonfuls of flour from the dry ball, mix it with cold water to a smooth paste, and stir it into half a pint of boiling milk. Simmer about three minutes, and sweeten. This is considered especially good for children while teething.

15. *Oatmeal Gruel.*—Boil a tablespoonful of oatmeal in a pint of water for three quarters of an hour, then put it through a strainer. If too thick, reduce with boiling water to the desired consistency. Season with salt.

16. *Oatmeal Gruel with Milk.*—Soak half a pint of oatmeal in a quart of water over night. In the morning add more water, if necessary, and boil for an hour. Squeeze through a fine strainer as much as you can, and blend it thoroughly with a pint of boiling milk. Boil the mixture for five minutes, and salt to taste.

17. *Cracker Gruel.*—Pour a pint of boiling milk over three tablespoonfuls of fine cracker-crumbs. Butter-crackers are the best to use. Add half a teaspoonful of salt, boil up once all together, and serve immediately. Do not sweeten.

18. *Indian-meal Gruel.*—Mix a scant tablespoonful of Indian-meal with a little cold water, and stir into a pint of boiling water. Boil for half an hour. Strain

and season with salt. Sugar and cream may be added, if desired.

19. *Arrowroot.*—Mix a teaspoonful of Bermuda arrowroot with four of cold milk. Stir it slowly into half a pint of boiling milk, and let it simmer for five minutes. It must be stirred all the time, to prevent lumps and keep it from burning. Add half a teaspoonful of sugar, a pinch of salt, and one of cinnamon, if desired. In place of the cinnamon, half a teaspoonful of brandy may be used, or a dozen large raisins may be boiled in the milk. If the raisins are preferred, they should be stoned, and the sugar may be omitted.

Corn-starch or rice-flour gruel is made in the same way.

20. *Sago Milk.*—Wash a tablespoonful of pearl sago, and soak it over night in four of cold water. Put it in a double kettle with a quart of milk, and boil till the sago is nearly dissolved. Sweeten to taste, and serve either hot or cold.

21. *Treacle Possett.*—Bring a cupful of milk to the boiling-point, and stir into it a tablespoonful of molasses. Let it boil up well, strain, and serve.

22. *Milk and Albumin.*—Put into a clean quart bottle a pint of milk, the whites of two eggs, and a small pinch of salt. Cork, and shake hard for five minutes.

23. *Koumyss.*—Dissolve a third of a cake of compressed yeast (Fleischmann's), or its equivalent of fluid yeast, in a little warm—*not hot*—water. Take a quart of milk fresh from the cow, or warmed to about blood-heat, and add to it a tablespoonful of sugar and the dissolved yeast. Put the mixture in beer bottles with patent stoppers, fill to the neck, and let them stand for twelve hours where you would put bread to rise—that is,

at a temperature of 68° or 70°. Then put the bottles on ice, upside down, until wanted.

24. *Wine Whey.*—Heat half a pint of milk to the boiling-point, and pour into it a wine-glass of sherry. Stir once round the edge, and as soon as the curd separates, remove from the fire and strain. Sweeten if desired. The whey can be similarly separated by lemon juice, vinegar, or rennet. With rennet whey, use salt instead of sugar.

25. *Mulled Wine.*—Into half a cup of boiling water put two teaspoonfuls of broken stick cinnamon and half a dozen whole cloves. Let them steep for ten minutes, and then strain. Beat together until very light two eggs and two tablespoonfuls of sugar, and stir into the spiced water. Pour into this, from a height, a cupful of sweet wine, boiling hot. Pouring it several times from one pitcher to another will make it light and foamy. Serve hot. The wine should not be boiled in tin.

26. *Milk Punch.*—To half a pint of fresh cold milk add two teaspoonfuls of sugar and an ounce of brandy or sherry. Stir till the sugar is dissolved.

27. *Eggnogg.*—Beat the white of an egg stiffly, then stir into it in turn a tablespoonful of sugar, the yolk of the egg, a tablespoonful each of ice-water, milk, and wine. Do not beat, but stir very lightly.

28. *Eggnogg, No. 2.*—Beat up one egg with a tablespoonful of sugar. Stir into this a cup of fresh milk, an ounce of sherry, or half an ounce of brandy, and a little nutmeg.

29. *Hot Eggnogg.*—Beat together the yolk of an egg and a tablespoonful of sugar, and stir into a pint of milk at the boiling-point. Add a tablespoonful of brandy or whisky, and grate a little nutmeg over the top.

30. *Syllabub.*—Dissolve two teaspoonfuls of sugar

in a tablespoonful of wine, put it in a pint pitcher, and take it to the cow. Milk into it till the foam reaches the top.

31. *Egg Water.*—Stir the whites of two eggs into half a pint of ice-water, without beating, add enough salt or sugar to make it palatable. Good for teething children with diarrhœa.

32. *Egg Broth.*—Beat together one egg and half a teaspoonful of sugar till very light, and pour on a pint of boiling water, stirring well to keep it from curdling. Add salt, and serve hot.

33. *Hot Milk and Water.*—Boiling water and fresh milk, in equal parts, compose a drink highly recommended in cases of exhaustion, as it is quickly absorbed into the system with very little digestive effort. This is also true of the egg broth above described.

34. *Lemonade with Egg.*—Beat one egg with two tablespoonfuls of sugar until very light, then stir in three tablespoonfuls of cold water, and the juice of a small lemon. Fill the glass with pounded ice, and drink through a straw.

35. *Barley Water.*—Wash thoroughly two ounces of pearl barley in cold water. Add two quarts of boiling water and boil till reduced to one quart—or about two hours—stirring frequently. Strain, add the juice of a lemon and sweeten. For infants omit the lemon.

36. *Toast Water.*—Toast three slices of stale bread to a very dark brown, but do not burn. Put into a pitcher and pour over them a quart of boiling water. Cover closely, and let it stand on ice until cold. Strain. Good for nausea from diarrhœa. A little wine and sugar may be added if desired.

37. *Apple Water.*—Slice into a pitcher half a dozen juicy sour apples. Add a tablespoonful of sugar, and

pour over them a quart of boiling water. Cover closely until cold, then strain. Slightly laxative.

38. *Gum-arabic Drink.*—Dissolve an ounce of gum-arabic in a pint of boiling water, add two tablespoonfuls of sugar, a wine-glass of sherry, and the juice of a large lemon. Cool and add ice.

39. *Flax-seed Lemonade.*—Into a pint of hot water put two tablespoonfuls of sugar and three of whole flax-seed. Steep for an hour, then strain, add the juice of a lemon, and set on ice until required.

40. *Potus Imperialis.*—To a quart of boiling water add half an ounce of cream of tartar, the juice of one lemon, and two tablespoonfuls of honey or sugar. Let it stand on ice until cold.

41. *Irish Moss.*—Wash thoroughly a handful of Carrageen moss, pour over it two cups of boiling water, and let it stand where it will keep hot, but not boil, for two hours. Strain, add the juice of one lemon, and sugar to taste.

Slippery-elm may be used in the same way, a teaspoonful of the powder to each cup of boiling water.

42. *Bran Tea.*—To a pint of wheat bran add a quart of boiling water. Let it stand where it will keep hot, but not boil, for an hour. Strain, and serve with sugar and cream. This is palatable and nutritious.

43. *Corn Tea.*—Parch brown a cupful of dry sweet corn, grind or pound it in a mortar. Pour over it two cups of boiling water, and steep for a quarter of an hour. This is light and nutritious.

44. *Rice Coffee.*—Parch and grind like coffee half a cupful of rice. Pour over it a quart of boiling water, and let it stand where it will keep hot for a quarter of an hour, then strain, and add boiled milk and sugar. This is nice for children.

45. *Crust Coffee.*—Take a pint of crusts—those of Indian-bread are the best—brown them well in a quick oven, but do not let them burn; pour over them three pints of boiling water, and steep for ten minutes. Serve with cream.

46. *Tea.*—Tea should be made in an earthen pot, first rinsed with boiling water. Allow a teaspoonful of tea to each half-pint of water. Put in the tea, and after letting it stand for a few moments in the steaming pot, add the water, freshly boiling, and let it stand where it will keep hot, but not boil, for from three to five minutes.

47. *Coffee.*—Stir together two tablespoonfuls of freshly ground coffee, four of cold water, and half an egg. Pour upon them a pint of freshly boiling water, and let them boil for five minutes. Stir down the grounds, and let it stand where it will keep hot, but not boil, for five minutes longer. In serving, put sugar and cream in the cup first, and pour the coffee upon them.

48. *French Coffee.*—Some people prefer filtered coffee to boiled. This is best made in a French biggin, consisting of two tin vessels, one fitting into the other, the upper one supplied with strainers. The coffee, very finely ground, is placed in this, and the boiling water allowed slowly to percolate through it. The pot is to be set where it will keep hot, but not boil, until the water has gone through. Pouring it through a second time will make it stronger, but it loses in flavor. *Café noir* is always made in this way.

49. *Coffee and Egg.*—Boil together for five minutes a tablespoonful of ground coffee, a quarter of an egg, a quarter of a pint of milk, and a quarter of a pint of boiling water. Beat an egg and four teaspoonfuls of

sugar together until stiff and light, and strain the boiling coffee into it, stirring all the time. Add two tablespoonfuls of hot cream. This is only to be given in small quantities.

50. *Chocolate.*—Scrape fine an ounce of Baker's chocolate, add two tablespoonfuls of sugar and one tablespoonful of hot water; stir over a hot fire for a minute or two until it is smooth and perfectly dissolved, then pour into it a pint of boiling milk, mix thoroughly and serve at once. If allowed to boil after the chocolate is added to the milk, it becomes oily, and loses flavor. Broma is made in the same way.

VOCABULARY.

Abdomen. That portion of the trunk situated between the diaphragm and the pelvis.

Abductor. A muscle drawing away from the median line.

Abnormal. Unnatural.

Abortion. Premature expulsion of a fœtus.

Abscess. A circumscribed cavity containing pus.

Acetated. Combined with acetic acid.

Acids. Chemical agents which redden vegetable blues. They are usually sour in taste.

Acronarcotic. Combining irritant and narcotic action.

Actual Cautery. A hot iron used in cauterization.

Acute. Sharp. A disease having rapid progress and short duration is said to be acute.

Adductor. A muscle drawing toward the median line.

Adhesion. Sticking together of unlike particles.

Albuminuria. The presence of albumin in the urine.

Alkalies. Substances which have the power of restoring the blues reddened by acids.

Alimentary Canal. The tube extending from the mouth to the anus.

Alterative. A medicine producing gradual change.

Amenorrhœa. Absence of the menstrual discharge.

Amorphous. Without regular shape.

Amylaceous. Starchy.

Anæmia. A lack of red corpuscles in the blood.

Anæsthesia. Loss of sensibility.

Anasarca. An accumulation of serum in the cellular tissue.

Anastomosis. Communication of vessels.

Anatomy. The science that describes the form and position of parts.

Aneurism. A dilatation or rupture of an artery.

Anodyne. Medicine to allay pain.

Antacid. A remedy against acidity.

Anthelmintic. A remedy against worms.

Antipyretic. Opposed to fever.

Antiseptic. Preventing putrefaction.

Anus. The opening at the inferior extremity of the rectum.

Aphasia. Loss of the power of speech.

Aphonia. Loss of voice.

Aphthæ. Small white ulcers of the mucous membrane.

Apnœa. Absence of breath.

Apyrexia. Absence of fever.

Aqueous. Watery.

Areola. 1. A circle around the nipple. 2. An inflamed circle around an eruption.

Areolar Tissue. Cellular or connective tissue.

Articulation. The joining of bones.

Artery. A vessel conveying blood from the heart.

Ascites. A collection of serous fluid in the abdomen.

Asphyxia. *Without pulse.* Suspended animation.

Assimilation. The process by which bodies appropriate and transform other matters into their own substance.

Asthenia. *Want of strength.* Exhaustion.

Astringent. Having the power of contracting organic tissues.

Atrophy. Wasting away.

Auscultation. The act of listening, as applied to the heart and lungs.

Autopsy. The examination of a body after death.

Axilla. The arm-pit.

Ballottement. The falling back of the fœtus *in utero* when displaced by the examining finger.

Benign. Of a mild character.

Bile. The secretion of the liver.

Biology. The science of life.

Bistoury. A small, narrow-bladed knife used in surgery.

Borborygmus. A rumbling in the intestines.

Bougie. An instrument, shaped like a candle, for dilating mucous canals.

Bulimia. Abnormal appetite.

Bursa. A small sac containing fluid, found near the joints.

Cachexia. A generally bad condition of the body.

Cadaver. A dead body.

Cæsarean Section. The operation of removing a child from the uterus by incision through the abdomen.

Calcareous. Having the nature of lime.

Calculus. A stone.

Callus. The new material thrown out to unite the fracture of a bone.

Capillary. Hair-like in size.

Capsule. 1. A membranous expansion inclosing a part. 2. A gelatinous envelope in which medicines may be given.

Carcinoma. Cancer.

Cardiac. Pertaining to the heart.

Caries. Ulceration of bone.

Carminative. A remedy which allays pain by causing the expulsion of flatus from the alimentary canal.

Cartilage. A smooth, elastic tissue, somewhat softer than bone.

Catalepsy. A disease in which there is sudden suspension of the senses and of the will, the body remaining in whatever position it is placed.

Catamenia. The menstrual discharge.

Cataplasm. A poultice.

Cataract. An opacity of the crystalline lens.

Catarrh. Increased secretion from a mucous membrane.

Cathartic. A medicine producing free discharges from the bowels.

Caustic. A substance which burns living tissues.

Cellulitis. Inflammation of the cellular or connective tissue.

Cervical. Pertaining to the neck.

Cholagogue. A medicine increasing the flow of bile.

Chorea. St. Vitus's dance.

Chronic. Of long duration.

Chyluria. Milky urine.

Cicatrix. A scar.

Cilia. Hair-like projections.

Circumscribed. Distinctly limited.
Clinical. At the bedside.
Clyster. An enema.
Coagulation. Curdling of a fluid.
Coaptation. *Fitting together.* The act of adapting to each other the ends of a broken bone.
Cohesion. The force which holds like particles together.
Collapse. Complete prostration of the vital powers.
Colloid. Jelly-like.
Collyrium. Eye-wash.
Colostrum. The first milk secreted after confinement.
Coma. A state of profound insensibility.
Comminuted. Broken in small pieces.
Confluent. Running together.
Congenital. Existing from birth.
Congestion. The accumulation of blood in any organ.
Connective Tissue. A lace-work of fibrous threads which extends through all the organs of the body, binding their elements together.
Contagion. The communication of disease by contact.
Continuity. An uninterrupted connection of parts.
Contra-indication. An indication against.
Convulsions. Involuntary contractions of the muscles.
Corrective. Mitigating the action of.
Coryza. Inflammation of the mucous membrane of the nose, with free discharge.
Counter-irritation. Irritation excited in one part of the body to relieve another.
Crepitation. 1. The sound of air passing through fluid. 2. The grating made by rubbing together the ends of a broken bone.
Crepitus. Crepitation. Chiefly used in the latter sense.
Crisis. The turning-point in a disease.
Cumulative. Increasing by successive additions.
Cyanosed. Blue.
Cystitis. Inflammation of the bladder.

Decoction. 1. The operation of boiling certain ingredients in a fluid. 2. The result of such boiling.
Decomposition. Separation of a body into its component parts.
Decubitus. Manner of lying.

Defecation. The discharge of fecal matter.
Defervescence. The decline of fever.
Dejection. The act of emptying the bowel.
Demulcent. Soothing.
Deodorant. Destroying odors.
Desquamation. Scaling off of the skin.
Determination. Strong and rapid flow of fluid to any part.
Diagnosis. Distinguishing one disease from another.
Diaphoretic. A medicine which excites perspiration.
Diaphragm. The large muscle separating the chest from the abdomen.
Diastole. The dilatation of the heart and arteries on entrance of the blood.
Diathesis. A peculiar disposition or condition of the system.
Dicrotic. Rebounding.
Dietetics. A branch of medicine comprising rules of diet.
Digestion. Dissolving. The change which food undergoes in the alimentary canal.
Digital. Pertaining to the fingers.
Dilatation. Expansion in all directions.
Discrete. Distinct.
Disinfectant. An agent which destroys septic germs.
Dislocation. Displacement.
Distal. Farthest from the heart.
Diuresis. An increased excretion of urine.
Dorsal. Pertaining to the back.
Douche. A column or shower of fluid.
Drastic. Strongly active.
Duct. Any tube or canal.
Dysmenorrhœa. Difficult or painful menstruation.
Dyspepsia. Difficult digestion.
Dysphagia. Difficulty in swallowing.
Dyspnœa. Difficulty in breathing.
Dysuria. Difficult and painful passage of urine.

Ecchymosis. An extravasation of blood into connective tissue.
Effervescence. The escape of gas through liquid, independently of heat.
Effusion. A pouring out.
Electrolysis. Decomposition by electricity.

Embolus. A plug obstructing a blood-vessel.
Embrocation. A liniment.
Embryo. The fecundated germ in its early stages of development.
Emesis. The act of vomiting.
Emetic. Producing emesis.
Emmenagogue. A medicine promoting the menstrual discharge.
Emollients. Substances which relax and soften the tissues.
Emphysema. Air escaped into the connective tissue.
Emulsion. A mixture of oil and water.
Endemic. Peculiar to a locality.
Enema. A fluid preparation for injection into the rectum.
Enteric. Intestinal.
Enuresis. Inability to hold the urine.
Epidemic. A disease attacking many people.
Epigastrium. The region near the stomach.
Epispastics. Blistering agents.
Epistaxis. Hæmorrhage from the nose.
Eructation. Bringing up gas from the stomach.
Escharotic. A substance which occasions sloughing.
Exacerbation. An increase in the symptoms of a disorder.
Exanthemata. The eruptive fevers.
Excoriation. An abrasion of the skin.
Excretion. The throwing off of waste matter.
Expectant. Treatment by leaving disease to nature.
Expectorant. A medicine facilitating the expulsion of sputa.
Extension. Pulling out.
Extirpation. Complete removal.
Extravasation. The escape of the contents of vessels into the surrounding tissues.

Fæces. Evacuations from the bowels.
Fasciæ. Fibrous membranes binding parts together.
Fauces. The throat.
Febrile. Pertaining to fever.
Fenestra. *A window.* An opening.
Fissure. A crack.
Fistula. A narrow canal lined by false membrane.
Flatulence. Gas in the alimentary canal.

Fluctuation. The undulation of fluid as felt by the hands.
Fœtus. The young of any animal in the uterus.
Fontanelles. Spaces between the cranial bones in the young child.
Fumigation. Charging the air with gas or vapor.
Function. The office or duty of an organ.
Fundus. The base.

Galactorrhœa. An excessive flow of milk.
Gall-stones. Biliary concretions.
Gangrene. The first stage of mortification.
Gastric. Pertaining to the stomach.
Genital. Pertaining to the function of reproduction.
Germ. The undeveloped rudiment of a new being.
Gestation. Pregnancy.
Gland. An organ having the function of secretion.
Globus hystericus. The sensation as of a ball in the throat.
Granulations. Small red eminences forming on the surfaces of suppurating wounds.

Hæmatemesis. Vomiting of blood.
Hæmaturia. Blood in the urine.
Hæmoptysis. Spitting of blood.
Hæmorrhage. The escape of blood from its vessels.
Hæmostatic. An agent to stop hæmorrhage.
Hemicrania. Pain in one side of the head.
Hemiplegia. Paralysis of the lateral half of the body.
Hepatic. Relating to the liver.
Hernia. The displacement and protrusion of a viscus from its natural cavity.
Histology. The minute anatomy of the tissues.
Hydragogue. A medicine causing watery evacuation.
Hydrated. Combined with water.
Hydropathy. Water-cure.
Hygiene. The preservation of health.
Hyperæmia. An excess of blood in the capillaries.
Hyperæsthesia. Excessive sensibility.
Hyperpyrexia. Very high fever.
Hypnotic. Sleep producing.
Hypodermic. Subcutaneous.

Idiosyncrasy. Peculiarity.
Impacted. Wedged in.
Imperforate. Without an opening.
Incontinence. Inability to restrain.
Incubation. Hatching. The period between the reception of a poison and the appearance of the symptoms.
Indolent. Giving little or no pain.
Induration. Hardness.
Infection. The communication of disease.
Infiltration. The escape of fluids into connective tissue.
Infusion. 1. The process of steeping a substance in fluid. 2. The resulting liquor.
Inoculation. Injection of a virus into the body.
Insertion. The attachment of one part to another. Of a muscle, the movable point toward which its force is directed.
Insomnia. Sleeplessness.
Inspiration. Drawing in the breath.
Intermittent. Ceasing at intervals.
Intravenous. Within a vein.
Intussusception. The slipping of one part of the intestine into another.
Inunction. The rubbing in of an ointment.
Involution. The gradual return of parts to a normal size and condition.
Irreducible. Not to be replaced.
Irrigation. Regular and continuous washing of a part.
Irritation. Excess of vital movement, usually manifested by increase of circulation and sensibility.
Isothermal. Having the same temperature.

Jaundice. Yellowness resulting from some obstruction in the course of the bile.

Laceration. A breach made by tearing.
Lactation. Suckling.
Laparotomy. Opening the abdomen.
Lateral. On the side.
Laxative. A gently evacuating medicine.
Lesion. Injury or disorder.
Lethargy. Stupor.

Leucorrhœa. A white vaginal discharge.

Ligation. Tying.

Ligature. The thread used for tying a vessel.

Litmus. A vegetable blue pigment. Acids turn it red.

Lochia. The discharge of blood and serum following child-birth.

Luxation. A dislocation.

Lymph. 1. The fluid contained in the lymphatic vessels. 2. The fluid poured out in adhesive inflammation.

Maceration. Making soft by steeping.

Malaise. Indisposition.

Malaxation. Kneading.

Malformation. Irregularity in structure.

Malignant. Serious in character.

Malingery. Feigning disease.

Malnutrition. Poor nourishment.

Marasmus. Wasting away.

Massage. Malaxation of the muscles.

Median Line. An imaginary line dividing the body longitudinally into two equal parts.

Menorrhagia. Excessive menstruation.

Menstrual. Monthly.

Metastasis. A change in the seat of a disease.

Miasm. A poisonous emanation.

Micturition. The act of passing water.

Miscarriage. Premature expulsion of a fœtus.

Mole. 1. A fleshy growth in the uterus. 2. A rounded fatty nævus.

Morbid. Diseased.

Morbific. Causing disease.

Moribund. About to die.

Mortification. Loss of life in a part.

Mucus. A viscid fluid secreted by mucous membranes.

Multipara. A woman who has given birth to several children.

Nævus. A birth-mark.

Narcotic. Stupefying.

Narcosis. The condition produced by narcotic substances.

Nares. The nostrils.

Nates. The buttocks.
Nephritic. Pertaining to the kidneys.
Neuralgia. Non-inflammatory pain in a nerve.
Neurasthenia. Nervous debility.
Neuroses. Diseases of the nervous system.
Neutralize. To counteract.
Normal. Natural.

Obstetrics. Midwifery.
Occipital. Relating to the back of the head.
Occlusion. Shutting up.
Œdema. Swelling from the infiltration of serum into the areolar tissue.
Officinal. Authorized by the pharmacopœia.
Oleaginous. Oily.
Olfactory. Relating to the sense of smell.
Onychia. An abscess at the side of the finger-nail.
Opiate. A medicine containing some form of opium.
Organ. Part of a living being exercising some special function.
Origin (of a muscle). Its fixed or central attachment.
Orthopædic. Correcting deformity.
Orthopnœa. Inability to breathe lying down.
Osmosis. The passage of fluid through a porous solid.
Osseous. Bony.
Ossification. Conversion into bone.
Ovulation. The formation of ovules in and their discharge from the ovary.
Ovum. The embryo and its membranes.
Oxidation. Combining with oxygen.
Ozæna. An offensive discharge from the nose.
Ozone. A peculiar modification of oxygen.

Palliative. Alleviating.
Palpation. 1. The sense of touch. 2. Exploring diseases by pressure with the hand.
Panacea. A universal remedy.
Papilla. 1. The nipple. 2. A small eminence on the surface.
Paracentesis. The operation of tapping.
Paralysis. Loss of voluntary motion or sensation.

Paraplegia. Paralysis of the lower half of the body.

Parasiticide. An agent that kills parasites.

Paroxysm. A periodical attack or exacerbation of a disorder.

Pathology. The physiology of disease.

Patulous. Wide open.

Percussion. Striking on a body to elicit sounds.

Peristaltic. Undulating or worm-like. Applied particularly to the motions of the alimentary canal.

Pessary. An instrument to support the uterus.

Petechiæ. Spots on the skin occurring in the course of severe fevers.

Pharmaceutics. The science of preparing medicines.

Pharmacopœia. A book giving directions for making medicines.

Physical. Pertaining to material things.

Physiology. The science of life.

Pipette. A small glass tube.

Placenta Prævia. The attachment of the placenta over the mouth of the uterus.

Plastic. Formative.

Polypus. A kind of tumor occurring in mucous membranes.

Post mortem. After death.

Primipara. A woman who bears her first child.

Process. An eminence of bone.

Prognosis. A prediction of what course a disease will take.

Prolapse. A falling down.

Prophylaxis. Prevention.

Proximal. Nearest the heart.

Psychical. Pertaining to the mind.

Ptyalism. Salivation.

Purgative. Cathartic.

Purulent. Having the character of pus.

Pus. A secretion from inflammation.

Pustule. A minute abscess.

Pyæmia. Contamination of the blood by pus.

Pyrexia. Fever.

Quarantine. Enforced isolation as a preventive of contagion.

Quickening. The first movements of the fœtus felt in the uterus.

Râles. Sounds in the air-passages produced by air passing through fluid.
Rectification. The process of refining liquids.
Reduction. The restoring of displaced parts.
Recuperative. Tending to recovery.
Refrigerant. Producing cold.
Regimen. Regulation of diet.
Regurgitation. Throwing back a portion of the contents.
Relapse. A return of disease.
Relaxation. Remitting tension. Opposed to contraction.
Remission. Abatement of symptoms.
Resolution. Gradual disappearance of a disease.
Rigor. A chill.
Rigor mortis. A stiffening of the muscles occurring after death.
Rubefacient. Making red.

Sac. A bag or pouch.
Saccharine. Containing sugar.
Salivation. Excessive secretion of saliva.
Saturation. The union of one substance with another until it can take no more.
Scarification. Making several small incisions.
Scybala. Hard lumps of fæcal matter.
Secretion. The process by which substances are separated from the blood.
Secundines. The placenta and the membranes remaining in the uterus after the birth of the child.
Sedative. Quieting.
Sepsis. Putrefaction.
Septic. Producing putrefaction.
Sequelæ. Morbid phenomena resulting from disease.
Shock. Sudden depression of vital powers.
Show. A vaginal discharge occurring just before labor.
Sinapism. A mustard plaster.
Singultus. Hiccough.
Sinus. Any cavity the interior of which is larger than the opening.
Slough. A dead portion separating from the living.
Sordes. An accumulation of the secretions of the mouth upon the teeth.

Spasm. An involuntary muscular contraction.

Speculum. An instrument for dilating cavities.

Sphincter. A circular muscle constricting a natural opening.

Sporadic. Occurring in single or scattered cases.

Sputum. Matter spit out.

Stercoraceous. Fecal.

Stertor. A deep snoring sound accompanying inspiration.

Stethoscope. A tube for conveying sounds from the chest to the ear.

Strangury. Slow and painful passage of urine.

Stricture. Contraction of a duct or tube.

Stupe. The cloth used in fomentations.

Stupor. Profound unconsciousness.

Styptic. Astringent.

Subcutaneous. Under the skin.

Sublimation. The process of volatilizing and condensing.

Subsultus. Muscular twitching.

Sudamina. Small vesicles associated with profuse sweating.

Sudoriferous. Sweat-bearing.

Suppository. Medicine in a solid form intended for introduction into the rectum.

Suppression. The stoppage of a secretion or discharge.

Suppuration. The formation of pus.

Sutures. 1. The articulations of the bones of the skull. 2. Stitches for holding together the edges of a wound.

Symptom. An appearance in disease.

Syncope. Fainting.

Syphilis. An infectious venereal disease.

Systemic. Pertaining to the body generally.

Systole. The contraction of the heart and arteries.

Tactile. Relating to the sense of touch.

Tampon. A plug.

Tenesmus. Frequent, vain, and painful efforts to evacuate the bowel.

Tension. State of being stretched.

Tent. A cylinder for dilating parts.

Tetanus. A disease characterized by continuous muscular spasm.

Therapeutics. The treatment of disease.

Thrombosis. The obstruction of a blood-vessel by a clot.
Tidal Air. The air expired and inspired in ordinary respiration.
Tincture. A solution in spirit.
Tissue. The peculiar structure of a part.
Tone. A proper state of tension or firmness.
Tonic. A medicine increasing the strength.
Torsion. Twisting.
Toxic. Poisonous.
Transfusion. Process of transferring blood from one animal into the veins of another.
Traumatic. Resulting from a wound.
Trituration. Reducing to a fine powder.
Tubercle. A deposit of degenerate matter in the substance of organs.
Tumefaction. Swelling.
Tumor. A morbid enlargement.
Tympanites. Distention of the abdomen by gas.

Ulcer. A solution of continuity of the soft parts resulting from perverted nutrition.
Unguent. An ointment.
Uræmia. Poisoning by urea in the blood.
Urea. The nitrogenous constituent of the urine.
Utero-gestation. Pregnancy.

Vaccination. Inoculation with the virus of cow-pox.
Vascular. Full of vessels.
Vein. A vessel carrying blood toward the heart.
Venereal. Pertaining to sexual intercourse.
Vermifuge. Driving out worms.
Vernix Caseosa. A fatty deposit found on the fœtus or new-born child.
Version. Turning.
Vertigo. Dizziness.
Vesicant. A blistering agent.
Vesicle. A very small blister.
Viable. Sufficiently developed to live.
Virus. A morbid poison.
Viscera. The internal organs.

Viscus. Singular of viscera.
Vital. Pertaining to life.
Vivisection. The dissection of a live animal.

Wisdom Teeth. The last of the true molars.
Wound. A solution of continuity in the soft parts resulting from injury.

Zymotic. Resulting from fermentation.

INDEX.

THE END.

THE CARE AND FEEDING OF CHILDREN. A Catechism for the Use of Mothers and Children's Nurses. By L. EMMETT HOLT, M. D., Professor of Diseases of Children in the New York Polyclinic; Attending Physician to the Babies' Hospital and the Nursery and Child's Hospital, New York. 16mo, 65 pages. Cloth, 50 cents.

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